COAL AGE

McGRAW-HILL COMPANY, INC.
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

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Our Ventilation Notions

EUGENE McAULIFFE, as usual, looks ahead of his contemporaries. Our laws are based largely on non-gaseous conditions. They provide rules to keep our mines free from "noxious gases," the carbon dioxide and the unburnt gases of the long discarded oil-flame torch and from the gases from explosives burned and partly burned. Still the logic of making the quantity of air dependent on the number of men has some validity. Where there are more men, there are larger areas to ventilate and as more coal is broken, more gas is made.

However, the logic at best is bad. The better plan is to base the quantity on a fixed minimum per man with a requirement that the methane in the return be less than a given percentage. Today we can measure the percentage of methane and it should be determined, the ventilation being made dependent on it. Furthermore the air should be well distributed. Our anemometers are poor instruments at best in a sluggish current. If they had been better, we should have found mine inspectors long ago insisting on men receiving at their working places the minimum quantity required by law. Unfortunately, even now it is impossible for them to make any such demand. They could not measure the air even when it is supplied, so they are obliged to satisfy themselves by insisting that the air passing the last crosscut of an entry shall be enough to supply all the men working on that split, not a very satisfactory requirement, as we all know.

We Have Skimmed the Cream

EUROPE builds for generations. It anticipates that it will continue mining seam after seam till all is mined, whereas we are merely skimming the cream. In most cases we have assumed that there is only one good and workable seam in a hill. Perhaps there is but one today, but there will be more tomorrow, for by the time one seam is exhausted, another, or more than one, has become valuable by reason of the general depletion of the thicker, cleaner measures available for operation.

In the anthracite region seven or eight seams, one above the other, are being mined. In the Connellsville region the Pittsburgh seam is becoming exhausted and the Sewickley is being attacked. In the Georges Creek field the Big, or Pittsburgh, bed has had its day, and the Tyson, or Sewickley, thin as it is, is being mined. In the Clearfield region, the Moshannon, or *"D,"* bed has almost disappeared and mining in the Lower Kittanning bed and other seams has followed. These are a few examples but there are many others.

Why not build like Europe, as far as houses are concerned—for generations? We believe that practice will become general as the cost of lumber increases and deeper—and therefore more extended—beds are attacked. The miners, in America, live in frame houses and own automobiles. In Beligum they live in well-designed residences and own bicycles. Someday, perhaps we shall be somewhat like-minded, and better housing will be customary.

However,—and here we hedge—as our rate of extraction is speeded we probably shall continue to face the difficulties that are part of such rapid extraction. Our villages cannot be permanent, if a few short years end their usefulness.

"It Can't Help It"

AFTER outlining a new scheme to the superintendent or manager for effecting a saving in operation or maintenance, the electrical or mechanical man is asked, "How do you know it will work?" Characteristic replies are, "Well, it looks like it ought to," and "It can't help it."

Is it difficult to guess which reply is from the "cut and try" man, and which is from the man who has made a careful study of his line of work? The fast-passing "Let's try it" type may become a fairly valuable man if he lives long enough and is fortunate enough to be able to continue performing costly experiments at the company's expense.

Today we must reduce labor costs; this requires the use of more and newer types of machinery. The cost to own and maintain this equipment tends to offset the labor saving. How can the margin be increased? Putting the supervision of the mechanical and electrical equipment into the hands of a man who has the required training and experience may be the solution. At times of low profit costly mistakes are unusually distressing.

The Private Police Nuisance

PRIVATE police we are told are an anomaly not contemplated by the fathers of our country. Whether that is true or not, the private hiring of police is not desirable and is comparable to employment of retainers on feudal estates. To each baron was left the task of keeping order, and he did it by maintaining armed men in or adjacent to his castle.

It was not a happy way of solving the situation. With the passage of time it was ended. The state became strong, it provided its own guards, and the law was better maintained. We condemn feudalism, but it was better than disorder. It was the only hope in those disorderly times. Where the state is strong and vigilant there is little need for feudal retainers or armed guards.

When the rulers are prompt to enforce the law and repel disorder the land owner does not look for any other assistance unless he is desirous of subverting the law. But where governors are mere puppets of the

electorate, when their main concern is to keep not their oaths but their votes or the votes of the party, private police are almost inevitable.

The duty of the state is to maintain order and not to mend it after it is broken and the damage is done. If this is not the law it should be or we shall drift into feudalism insensibly. Even now in banks we have armed detectives and armed employees. We have our armored cars and armed men traveling the streets on behalf of banks as well as on behalf of the U. S. government.

At the mines also we sometimes have armed guards. It is distinctly unfortunate, but usually in such cases the state is weak, venal or penurious, and the people suffer. The fault is with the state. The crime is that of the politicians, no matter how diligently they may try to place it elsewhere. If we have feudal weakness at government centers we shall have feudal conditions throughout the country. Feudalism was the outward sign of a disease known as defective nationhood.

Talking Through the Ground

THERE are men in the coal industry who scoff at the news that an Illinois high school teacher and a bunch of his boys have perfected radio equipment and a circuit by which telephonic communication can be set up between a mine and the surface. They say: "What's the use of it, even if it does work experimentally? There would only be a one-in-a-million chance that miners caught in a blast could get to one of the underground radio telephone sets, and even if they did, it wouldn't do much good, for relief parties can do a good job of locating imprisoned miners as it is."

This is somewhat idle talk. It is a well known fact that relief parties cannot always locate imprisoned men easily. In fact they often cannot locate them until they are all dead. If Mr. McCall and his boys—and girls; for there are four in the Springfield High School Radio Club—have made it possible for men on the surface to talk straight down through the ground to points in a mine directly beneath their feet, something beneficial has been done for mine rescue work. Let there be no mistake about that.

Even if miners in an explosion had only one chance in a million to get into a radio-equipped refuge chamber, still the device would be worth while, for a human life is precious. But the chances would normally be a great deal better than one in a million. And what would be the cost of properly equipping a mine? This cannot be said definitely. Permanent installation and maintenance would add something, but whatever the cost, it probably would be modest in comparison with the value of lives of men. So if these Springfield boys actually have done something constructive, let their elders in coal mining recognize it. In fooling with radio, the boy is always likely to do the thing a man thinks is impossible.

Nearly every invention starts hampered by limitations that make it of doubtful utility. But the step once taken, experiment follows and the limitations are one by one lessened or removed. "What use is it?" is not the appropriate question, but rather, "Of what uses may it be as conditions change and limitations are removed?"

Law and Sentiment

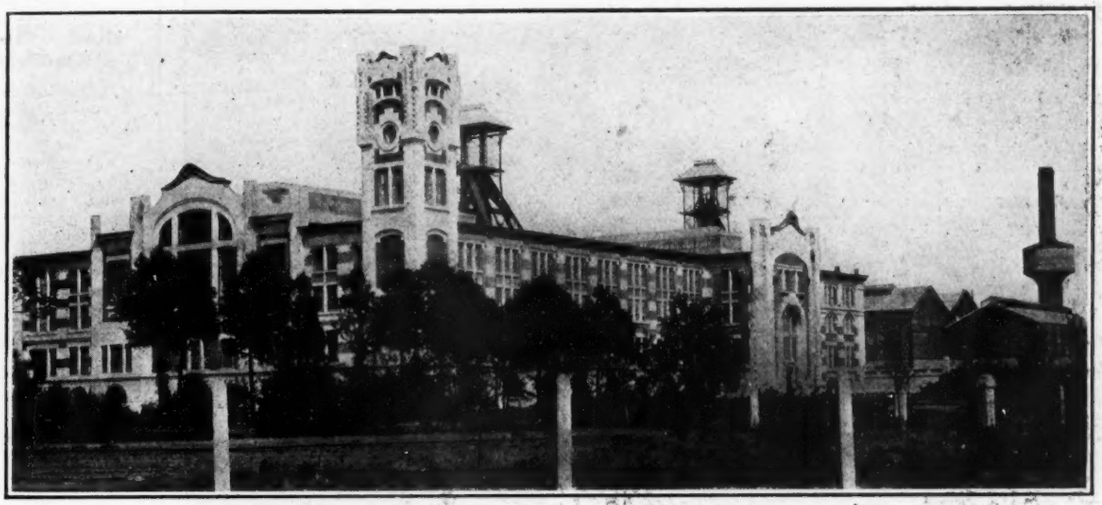
NO ONE CAN fail to appreciate that a right sentiment, as regards safety, is better than stringent regulation, but, unfortunately, the right point of view fares but badly in face of fierce competition. With prices as low as those now existing there is sure to be a tendency toward short cuts, the operator hoping that somehow the accidents which go with economies in management and method will somehow escape him. Sometimes he does escape them for months, even years, and then the fatal moment comes and he finds that he must pay the penalty of his evasions.

The Rocky Mountain Coal Mining Institute's safety committee, the report of which we publish today, lays stress on the possibilities of a sentiment created for safety, and the West has always shown an excellent spirit in this matter. It has for years regarded the laws as minimum provisions for safety and sought a more excellent maximum. That it has not attained safety has been due to the fact that the state of the mining art did not afford methods sufficiently safe to meet the unusual dangers of Western mines.

The failure of the West to avoid severe explosions has been due not to law breaking but to lack of knowledge of the way in which to avoid explosions. That lack of information was nation-wide and particularly distressing in the West because nearly all the problems presented themselves in their most acute form. In justice to the West, it must be said it has been disposed always to lead in safety methods, to devise new safety plans, to use its brains to anticipate trouble, but with all its effort, originality and willingness to engage technical graduates, it has not been able to keep its mines as safe as those in the East, due to the inherent dangers of the coal on the Rocky Mountain slopes.

But, however much we may approve the spirit of the West in general and that of the Rocky Mountain Coal Mining Institute in particular, we cannot endorse its sentiment toward the law. We want more and better laws, we should advocate them and not merely take an indifferent attitude to them. With the sentiment toward good practice, laws to enforce correct action on the few unwilling should make for better mines. The laws are antiquated, sometimes positively harmful unless disregarded, and they should be made more in accord with modern knowledge and practice and also more stringent. There are too many lawyers, doctors, butchers, and bakers, who do not know anything about mining, who own and control mines. There are too many catch-penny mine owners. The industry needs laws to control them and to quote to them. The better operators have to compete with these ill-instructed or ill-meaning men and desire that they shall have to meet the same bills for safety as other operators.

The other day the telephone bell rang. An operator at the other end of the line wanted to know if there was any law to prevent him from drawing the pillars on his main entry; the coal looked near and easy to mine. He was assured that there was no such law, but that he had better beware of any such practice or he would have no mine. This is an extreme case but with such men we need law, not, perhaps, to prevent that particular action, but to keep them from doing others not so obviously foolish but more harmful to the workman and to their business rivals.



Office and Bathhouse at the André Dumont Colliery

Campine Mining Villages Resemble Garden Cities

Equipment Provided the Mines Without Stint—Koepe System of Hoisting Used—Permanent Materials of Construction Employed—Towns Artistically Designed by Skillful Architects—House Interiors Immaculate

By D. Adam
London, England

UNUSUALLY liberal has been the equipment of the collieries in the Campine district of northeastern Belgium. Modern machinery and appliances are housed in palatial buildings that have nothing of the cramped and crowded architecture characteristic of the older collieries. The streets and lanes of the upper works have given way to the "grands boulevards," where there is neither congestion of traffic nor accumulations of stores or materials. The engineer coming from the narrow galleries of the mine may be inclined to think that his brethren on the surface have run riot in the abundance of space that has been afforded them, but closer examination will satisfy him that all has been planned to lighten the labors of those below ground, whose working space is limited by a roof and floor little more than two ft. apart.

The workshops are designed to make the collieries, as far as possible, independent of outside engineering assistance. Not only has provision been made for all normal repair work, but for the manufacture of such equipment as mine cars, cages and small pumps. At the André Dumont colliery it is even proposed to instal an electric furnace for making steel castings.

At nearly all the collieries, pulverized coal is to be used for boiler firing. It is estimated that this will save 25 to 30 per cent in fuel consumption. The Limbourg-Meuse colliery has already two boilers equipped for burning powdered coal, and the results so far obtained have been highly satisfactory. A pulverizing and distributing plant is now under construction at Winterslag for supplying a battery of fourteen boilers.

Campine Shafts Use Koepe Hoisting System

One feature that specially strikes the visitor to these Campine shafts is the use of the Koepe hoisting system. This system is not much in favor with engineers outside Belgium and Germany, but in these countries it is strongly advocated for deep shafts, even those equipped with four-deck cages carrying eight cars of 600 kilos (1,323 lb.) capacity. One reason given for its adoption is that the coal is hoisted from different levels in the shaft and for such work the cylindro-conical drum is not suited.

In nearly every case when the production stage has been reached, electric hoisting engines are employed. Both underground and on the surface arrangements are made for the simultaneous loading of at least two of the cage decks. The shafts, as previously mentioned, are equipped with four hoisting compartments, and this also has been a factor influencing the choice of the Koepe system, for the space occupied by the engine and pulley is far less than that taken up by drums. The engines also can be placed alongside one another without excessive "angling" of the hoisting rope. The collieries generate their own electric power and are fitted with magnificently equipped central plants feeding the surface works and underground substations.

The baths provided for the miners are so luxurious, with their individual tiled compartments and showers, that their attraction must be irresistible even to those

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Note—The André Dumont colliery shown in the headpiece is one of the newest in the Campine region although none are old in any sense. The employees enter the operation by way of the large doorway toward the right of the illustration. Surface workers may go direct to their respective places but the underground employees go to the shafts by way of the washhouse and bathroom. At the "inquiry windows" in the large hall the workman can get in touch with any department or receive instructions for the day's work.

Some of the Geological features and operating characteristics of the Campine field were described in the issue of Aug. 21 pp. 247-251.

FIG. 1

Miner's Houses, Winterslag

Materials for permanent construction are abundant in this locality. Thus good stone for foundations, sand and gravel for making concrete, and clay for brick and tile manufacture may be found in the immediate proximity of the mines. As a result these materials are used freely in construction. Houses like these are not only neat and attractive but durable and the upkeep is almost negligible.

most firmly addicted to the family tub. A salutary Belgian law requires mine owners to provide change houses and baths for the miners, but it cannot compel the miners to use them. Some moral persuasion may be used, but it is rarely needed. The Belgian miner accepts the bath with thankfulness and would not tolerate the conditions common in British operations, where the miners, wet and dirty from their day's work, often have to travel long distances by train or trolley to their own and their fellow-passengers' discomfort. British tourists with the virtuous feeling engendered by their own devotion to the "morning tub," formerly spoke reproachfully of their Continental neighbors' neglect in this important matter, but, so far as the mining industry is concerned, the reproach is now all the other way.

The tourist inclined to adopt airs of superiority will learn another lesson in the Campine, perhaps still more humbling. The housing of the mine employees in this region is a model to the whole world, and a revelation to those familiar with the rows of squalid dwellings that surround the old-time colliery. Apparently, in former times, it was considered that the miner would be out of his element if the dirt and discomfort with which he was surrounded during his working hours were lacking in his hours of leisure. Another grave error of those days was to suppose that miners' houses could be designed by an engineering draftsman, on the simple principle of drawing with straight edge and tee square a row of rectangles for the ground plan and another series of rectangles, with smaller rectangles inserted, for the front elevation.

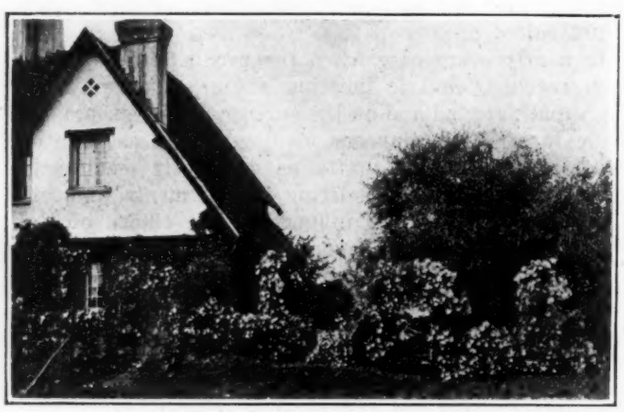


Fig. 2—A Miner's Garden, Once a Sandy Waste

This "old world" garden located in the town of Winterslag, shows what can be accomplished in the way of transforming the sandy moors from a stretch of waste land into an attractive home. Intelligence, water, work and fertilizer did the trick.

The first plans for the garden cities of the Campine were made by engineering draftsmen it is true, and the inevitable rows of rectangles made their appearance. The land available—and there was plenty of it—was divided into squares and as each of these was a duplicate of the others, one detailed plan multiplied by blue printing served the needs of the bulding contractors. Fortunately wiser counsel prevailed, and architects were summoned. These men with greater skill and a finer artistic sense, designed the beautiful communities that today are springing up on the old waste moorlands of the Campine.

Winterslag Makes Sandy Soil Produce

Winterslag already has a population of more than 4,000. A church is under construction as well as a school, eight hotels for bachelor employees, numerous cafés and canteens and the indispensable cinema or "movie." The sandy soil has been made fertile by dint of hard work and every house has its flower garden. The broad avenues and boulevards, laid out on graceful curves, are lined with trees and at every step there is something to attract and please the eye. It may be nothing more than a variation in a doorway or gable, or the style of architecture may be completely changed, but always the effect has been thought out and in every line there is evidence of the artist's hand.

Perhaps the cost was a little more than that of standardized rectangles, but so little more that no one with even the slightest perception of architectural beauty would give it a thought. One thing has helped the architect to obtain variety. Belgium is a democratic country and in her new-built cities of the Campine there are no Fifth Avenues or Park Lanes. The villas of the higher officials are, of course, more commodious and elegant than the miners' houses, but they are not set apart in some exclusive quarter for the aristocracy. On the contrary they are scattered here and there throughout the whole city and in the matter of postal address there is no invidious distinction between one street and another.

Inside the houses, the architect has been no less

FIG. 3

Hotel du Parc, Winterslag

Several hotels such as this have been constructed. Here the single men of the mines can board for about 8 fr. per day. This is equivalent to approximately $1.60 in our money at normal rate of exchange or about 40c. per day at the present exchange rate. A small and homelike hostelry is the Hotel du Parc. The Belgians believe that a house without a garden is a shed and not a home.

successful in his treatment, and Belgian housewives, famous for their spotless polished kitchens, are delighted with the opportunities afforded for the practice of their art. The husband who ventures to omit the change house and the bath on his homeward journey from the mine receives persuasion far more effective than any, moral or otherwise, that could be given him by the mine authorities. The accommodation in the houses is varied to suit different requirements. Large families are not unfashionable in the Campine, and generous provision has been made to house the young generation both in the homes and in the schools.

The colliery companies are building these cities with their own workmen. With a certain degree of assistance from the state in the form of loans at a low rate of interest, they have been able to build at a lower price than would have been possible had they employed an outside contractor. They were fortunate in finding close to the sites of their towns good sand and gravel for concrete, and clay for brick making. The provincial and local governments are contributing toward road building and drainage. Railway construction to meet the needs of this new industrial center is being provided by the Belgian State Railways.

To some, the expenditure entailed in building these garden cities may seem extravagant, more especially as the mines have not yet reached the stage of full production. The mental inclination of the Belgian workman must be taken into consideration, however, before just judgment can be passed. He is not an individual of the pioneering type, prepared to "rough it" in the wooden shanties of the traditional mining camp. Furthermore, work is not so scarce in Belgium that he need deprive himself of home comforts in order to earn his living. Consequently it was essential at the outset to attract labor by providing home attractions on a liberal scale. The Campine, before its transformation, had nothing to offer. To artists in search of the picturesque and to the sportsman with his gun it doubtless held many attractions, but the miner after his days' work demands diversion of another kind.

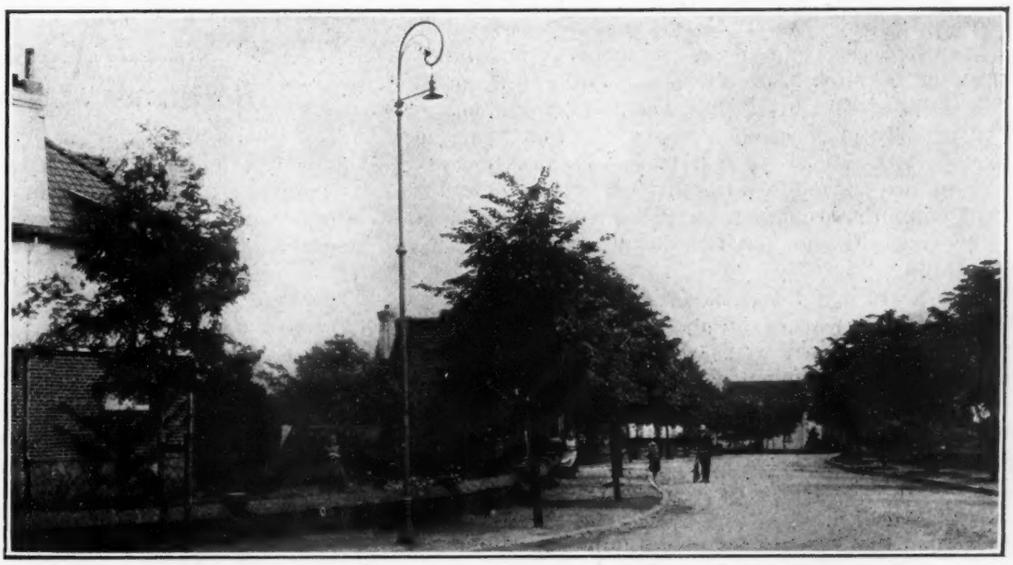
No doubt recruits from other countries could have been obtained on easier terms, but the colliery directors are anxious to employ as large a proportion as possible of Belgian workmen and to exclude especially the vagrant here-today-and-gone-tomorrow type. About 16 per cent of the miners in the Campine are foreigners, chiefly Poles, Czechoslovakians and Italians. This proportion is likely to increase with the growing labor demands of the mines. The Flemish population of the Limburg province is more inclined to farming than to mining, and the annual influx from the southern coalfield will hardly be sufficient to meet requirements.

But there is a younger generation that in time will

FIG. 4

Street Scene, Winterslag

Broad, gracefully curved streets and avenues, bordered with trees and artistically lighted are characteristic of these mining towns. To such communities as these with permanent abodes the term often applied of late years to the settlements of a similar nature in this country, namely, "a mining camp" is a misnomer.



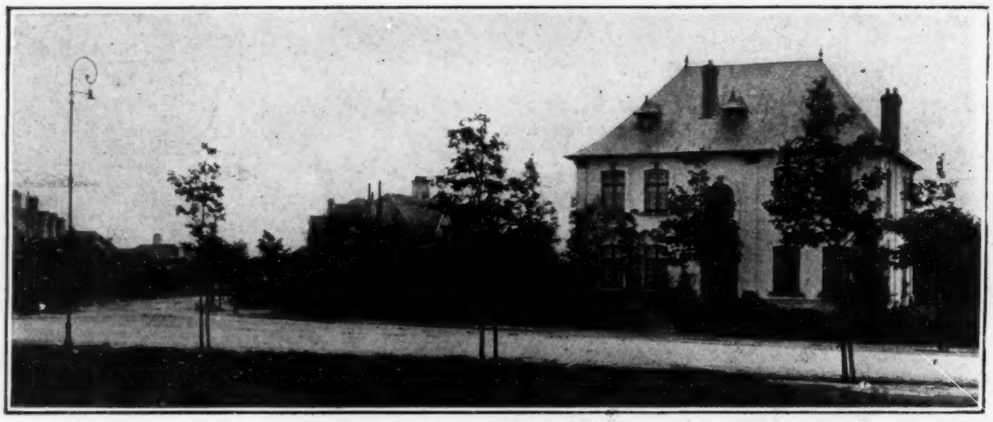


FIG. 5

A Villa

This picture shows a villa of a mine official, the home of a mining engineer, yet this building, as well as others of its kind is not set apart in some aristocratic secluded neighborhood but is placed among, and flanked upon either side by, the homes of miners. This is characteristic of Belgian mining towns.

inherit the land and supply all the labor that is necessary. As one of the engineers remarked with a wave of his hand over the extensive construction work in progress, "It is for the next generation we are building all this." It is to be hoped they will appreciate the enterprise and the foresight of the engineers who are working in the field today and laying such solid foundations for the benefit of those who are in future years to follow after them.

One word must be added in acknowledgement of the courtesy shown to the visitor by the mine managers and engineers of the Campine. To one of their own craft they are generous with their time and do not permit him to feel that he is trespassing upon it, nor to depart with any other impression than admiration of the engineering skill embodied in these colliery shafts and works, and pleasure in the hospitality which has enabled him to visit them.

The Miner's Torch

The Wife of the Boss Man

CHANGING conditions bring on new problems; sometimes these new problems are almost old problems before we realize their existence.

Automobiles have been in pretty general use around our mining camps now for about ten years. Fifteen years ago there might have been found an occasional auto in a mining camp, but generally speaking at that date an auto was almost a novelty to the average mining village. Five years later almost any camp with passable roads leading to nearby villages had fleets of them. The changes brought about in our home and family life during these ten years have been momentous and far-reaching but we are only just beginning to appreciate them. About ten years ago the son of one of my college chums was promoted from mining engineer to mine superintendent, and a few months later decided that his future was promising enough to justify matrimony. I should have said that he decided to embark on the "sea of matrimony" because that word picture describes his adventure so well; their little craft encountered many a terrifying storm and the end is not yet, although the last storms encountered have been mild.

Five years ago I learned of a similar case. A few months ago I learned of another. Back in the days when I was a newly wed newish superintendent I was acquainted with a number of young men who belonged in my classification, and neither I nor any of them ever were troubled with the terrifying storms encountered by these sons of my friends, so when I heard of the last adventure mentioned I decided to make a little investigation.

I found that most of the young mine superintendents of the present day who have passed from college to engineering jobs and then up to superintendent's desks have gone back to the cities (just as they did in my day) in search of their former sweethearts for wives, and while these young superintedents have had little love for the cities after marriage their brides are not similarly inclined. The automobile makes it possible for brides to keep in touch with city acquaintances and trips can be made back and forth without benefit of husbands and if necessary even without their knowledge.

Young superintendents have many duties and interests at the mines but the young wives are not so fortunate; whenever time begins to drag wives are apt to recall that an automobile is standing idle and then things begin to happen.

Back in my young days wives may have found time hanging heavy on their hands but they had to grin and bear it, at least that is what they did do. Blame the automobile? No! Blame the fathers who have censured the son's wives without realizing that times have changed.

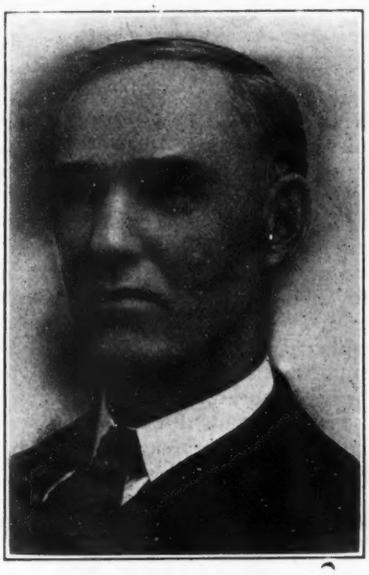
Resistance of Entry to Air

The results of a study of the resistance of coal-mine entries to the flow of air, made by Interior Department investigators at the experimental mine of the Bureau of Mines near Pittsburgh, Pa., are given in Serial 2621, recently issued. The Bureau of Mines initiated an extensive research on coal-mine ventilation factors in 1922, large-scale tests being conducted in its experimental mine over a period of two years. A comprehensive report on this work is in course of preparation but the present report is only the first of a series and considers only entries in which there are no obstructions other than the natural roughness of the ribs, roof, and floor. In order to place the practical results before the mining fraternity immediately and in condensed form, the more important features of the investigation will be presented in a number of short papers.

Too Much Guess Work in Mining to Suit McAuliffe

Head of Union Pacific Coal Co. Appeals for More Accurate Knowledge—Objects to Common Plan of Ventilating on Basis of Input per Man Without Proof That Air Does Its Full Job

PERHAPS the most apt criticism that is now being made of the coal industry is that, to an extent, possibly exceeding any other industry of similar magnitude and importance, it depends for its conduct altogether too much on "rule of thumb" and "tradition," rather than on proven practice and actual fact. There are yet too many chances taken—we are still "weighing pounds on railroad track scales" and measuring yards with the proverbial "bit of string." The actual expense of conducting any one of the several operations incident to the production of coal is rarely determined, and in many instances the general cost figures, prepared some weeks after the work is complete, are of such a sweeping character that little can be abstracted therefrom. Many coal companies are now making a daily cost sheet, showing the cost of labor and material in detail, as used in the several related operations. This is quite helpful, particularly to the mine superintendent and his foreman, who, without it, sail an uncharted sea. The auditor's belated monthly summaries are rarely ever seen by these men who are held responsible for the labor and material used. I have made reference to this situation to accentuate the fact that the coal industry contains more "serious-minded, conscientious guessers" than does any other similar industry, although the annual cost of our product runs up well beyond the billion-dollar mark.



Eugene McAuliffe

Now this brings me to the question of safety, the one question that should be, and which is, I know, uppermost in your minds. The coal-mining world, engineering and operating, is now well "sold" on at least two things—the theory of using permissible explosives and the elimination of the open light. Furthermore, the industry, particularly that portion which is located in the United States and Canada, is now planning vast extensions of the use of rock or shale dust, both in the form of dust barriers and in direct application to entries and crosscuts.

This is well. However, my study of past mine explosions has convinced me that the great majority of such blasts had their beginning in gas accumulations; frequently originating in restricted areas at the working face, in abandoned worked-out areas, or in some other place where ventilation is not maintained as it should be. And that again leads me to the point where it can again be well said, that there is too much rule of thumb, too much guessing now being done in regard to the volume of air required and continuously furnished, in a given entry, panel, room or area.

Just to emphasize this situation, is it not a fact that the majority of mine inspectors express the ventilation conditions as measured by them, in terms of cu.ft. per man employed, in each certain split, and do not the mining laws of many states yet demand a minimum of 100 or 150 cu.ft. per man, and 500 cu.ft. per minute for each mule, which is even worse than guessing distance?

By what process of reasoning can the relative freedom from gas in a given area be determined by the number of men employed? Five thousand cu.ft. of air, with one man employed, gives 5,000 cu.ft. per man. If 50 men are employed the result is 100 cu.ft. per man, the lawful minimum in certain states. This sounds insufficient but, as a matter of fact, the circulation created by the activities of 50 men adds to safety. This formula is a hoary survivor of the now obsolete, smoky, air-defiling oil lamp.

Again examine the average state mine inspector's annual report. You will find therein frequent reference to the size, type and drive of the fan used at a given mine and the cu.ft. of air handled, with water gage shown. However, the real question is, Does air reach every portion of the mine, does it scour the fresh working face and the shifting top in the pillar-drawing area, or does it, finding the line of least resistance, bypass through leaky stoppings, the circulation growing weaker, weaker, weaker, as it approaches the real gas-making territory?

Do you know you have air at the face? Have you a ventilation map of your mines, and do you get a regular and definite record of air at the face, or do you still use the rule of thumb?

Perhaps a simple illustration of what mine ventilation really means will be impressive. Take, for example, a mine producing 250,000 tons of coal annually, the average input of the mine fan 100,000 cu.ft. per minute, or 52,560,000,000 cu.ft. per year. We will disregard water gage, relative humidity and other factors in our calculations, dealing with weight alone. The mean weight of air at temperatures ranging from zero to 95 deg. F. approximates 0.0774 lb. per cu.ft., therefore the weight of air forced through this given mine in a year totals 2,034,072 tons, equal to 8.14 tons of air to each ton of coal hoisted.

Perhaps a simple computation of the volume of explosive gas (methane or CH_4), that is generated in an average mine may be equally illuminating. Let us assume the measure of air input given in the foregoing example, where the fan handles 100,000 cu.ft. of air per minute, equivalent to 144,000,000 cu.ft. in each 24 hours. Again assuming an analysis of the return air shows a gas content of one per cent, we find that

NOTE—From a paper read by Eugene McAuliffe, president Union Pacific Coal Co., before the summer meeting of the Rocky Mountain Coal Mining Institute, Rock Springs, Wyo., Aug. 8.

1,440,000 cu.ft. of gas is generated in the mine daily, a volume equal to the capacity of 450 standard 40-ft. railroad box cars, filled to the roof. As methane weighs approximately 0.0451 lb. per cu.ft., the day's outpouring of gas would weigh 32.47 tons.

You will bear in mind that this volume of gas is harmless when diluted in the proportion of one to ninety-nine, but as gas weighs only about 55 per cent of the weight of air its disposition is to rise to the top, unless the scouring action of an adequate ventilation current sweeps it out of the places where it tends to gather, reducing it by diffusion to a harmless quantity. The foregoing presentation of the magnitude of the ventilation problem may or may not be useful to you; doubtless many of you have properly weighed the job in times past. It might be well to size it up anew.

Certain of our friends, whose mines are located in districts where much water must be handled, stress the millions of ft.-lb. of energy required to keep their mines dry. Keeping them aired is an even greater and more important problem; you see the water, it asserts its presence when neglected, but air, or lack of air, is a more insidious, secretive enemy; it hides its fangs until the moment comes to strike and then it strikes hard.

All mine foremen know what bad track, poorly maintained, without proper surface and alignment, short turnouts, etc., means to their haulage. By it the mine operations are slowed down, the output decreases, costs run up. So it is with air, it also requires a proper traveling way; one reasonably free from short curves, abrupt elbows, falls or other restrictions.

Again, the airway is a pipe, it must be tight or the contents will leak away before it reaches its destination. There is much in common between the natural laws that govern the movement of mine cars, of water in pipes and of air, through air courses. These laws are simple, but they are immutable; ignore them, neglect them, and you pay the price.

Reverting to the question of rock dusting: we propose to complete a most extensive program in our Wyoming mines, one which has been under way for some months, but our men are, I hope, all sold to the theory of air, air at the face, the whole face, and that continuously for each of the twenty-four hours in the day.

That means a dependent fan drive, automatic restarters on fan motors where electrically driven; it means adequate aircourses, kept clean; tight stoppings with overcasts instead of doors, and an ever vigilant policeman in the form of a recording water-pressure gage on every fan, with a positive inspection of the fan chart by the mine manager before the man trip is allowed to enter the mine each morning, and that regardless of the number of gas men employed or the fact that they have just reported, "Mine clear." These charts thereafter are scrutinized by the resident mine superintendent, the general manager, the general superintendent and the safety engineer.

In conclusion, I have two broad appeals to make. One is for the education, development and encouragement of the underground mine supervisory forces who stand nearest to safety and economical operation. These men deserve more encouragement and help than is now given them; many of them need to be shown how to help themselves.

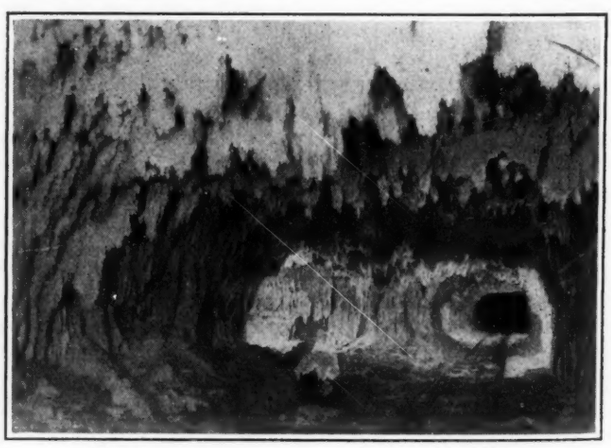
My second appeal is directed toward a better relationship with the working force. We take too much for granted there. The great majority of men wish to and will do the fair thing, but perhaps they are not met half way by the employers.

The coal industry has for too long been the football of a careless, speculatively inclined attitude of mind. It is a great, vital, pulsating industry, where nature and man should combine to get better results. The industry's digestive tract is now being taxed to assimilate the excess mines and man power taken in during the frenzied war and post-war period. It has suffered from too much hysteria on the part of both capital and labor in the past. A permanent sense of composure will prove a Godsend to those who depend upon it for fuel; to the men employed within it, and I might also add, to the wives and families of the mine workers, who have in the past taken too much punishment.

The extension of the theory of local chapters of this and similar institutes, with frequent meetings, every man employed invited and urged to attend and to take part, will definitely help toward the solution of the problems that now beset the industry and its people. They will help coal-mining men to *know* their work. The poet Tennyson said, "Better fifty years of Europe than a cycle of Cathay." Let our motto be, "Better one proven fact than a dozen guesses."

GAS BY THE CARLOAD

EUGENE McAULIFFE, with his well-known faculty of making ideas stick in men's minds, figures out that in a coal mine producing 250,000 tons a year and with an input of 100,000 cu.ft. of air per minute, the fans drive in 8.14 tons of air for every ton of coal hoisted. If this makes one per cent of gas in the return air, there would be 1,440,000 cu.ft. of gas removed from the mine in 24 hours. This is a volume equal to the capacity of 450 standard 40-ft. box cars. With thoughts like this in mind perhaps the average mine operator will better realize how important it is that his mine ventilation be complete and that he should know the air is doing its work and not merely *guess* at it.



Who Says There is No Beauty in a Coal Mine?

These "stalactites" and "stalagmites" appear each winter in the main slope of the mine at Scofield, Utah, formerly operated by the Union Pacific Coal Co. These manifestations of winter can be seen also in eastern mines. They constitute one of the difficulties of the mine superintendent. But rarely is the scene so picturesque as this.

Rocky Mountain Institute Lays Down Safety Code

Coal-Mining Authorities of Colorado, New Mexico, Utah and Wyoming Believe in More Observance Rather Than in More Law—Declare for Rock Dusting and Sprinkling—Want Constant Educational Campaign

TO DO ITS BIT for coal-mine safety, the Rocky Mountain Coal Mining Institute, at its Rock Springs, Wyo., meeting, Aug. 7-9, adopted unanimously a long safety report over which the Institute's safety committee had been working for a year. The committee, which consisted of G. B. Pryde, W. Littlejohn, D. Harrington, W. W. Risdon, J. Dalrymple, Glen Knox and P. F. Patterson, recognized that conditions vary from region to region and that therefore it is not possible to lay down one set of iron-clad rules. However, the committee declared for rock dusting and sprinkling in mines where there is both fine coal dust and methane.

The Institute believes there is less need for more state safety legislation than there is for closer observance of existing law. "Betterment of safety conditions in coal mines cannot be materially improved by extraneous influence or intervention," says the report, "but must come from within the industry itself by those who are familar with its conditions."

"We believe," reads the report, "that the propagation of safer practices in coal mining work will not be accomplished by laws if there is not the will nor the desire to obey them, but must ultimately be accomplished through education of the officials and the employees. The underground officials and particularly the mine foremen, on whom so much depends in coal mining, must be educated to recognize their responsibility and opportunity to spread the gospel of safety among the employees.

"The very fact that the mine foreman has been certified by the state as one capable of managing a mine and taking care of the safety of the employees under his charge should make him sensible of his responsibility and develop in him habits of patience, courtesy and persistency in all his relations with employees under his charge, and it will also be necessary to teach the employees that these rules and regulations are not designed to harass or circumscribe them in their daily work but have been developed for their safety and protection and for their personal welfare. When this has been accomplished a better understanding will have been reached and we may then look for a reduction in the accidents in and around coal mines. The following rules and regulations are submitted for your consideration and approval:

"(1) The mine foreman or someone who is in direct supervision of the workings should see that timbers are set properly and that dangerous places are made safe. Such places should not be left until the employee has been properly instructed how to take care of them.

"(2) There should be a closer inspection and patrol of working places, to prevent accidents from falls of coal and rock.

"(3) On all main haulageways a space of at least 30 in. should be left between rib and track, or timber and track, and in all rooms not less than 2 ft. should be left between the track and upright timbers.

"(4) Each mine should adopt a definite system of timbering of haulageways and working places, applicable to its particular conditions or seam.

"(5) Seeing that many accidents are caused by cars running away in rooms where "wild catting," McGinty or snubbing ropes are used and that this can be overcome by the panel method of working pitching beds, which eliminates the handling of cars by the miner on these grades, all rooms should parallel the strike and not the pitch.

"(6) Shooting off the solid should be abolished wherever possible.

"(7) Black powder should not be used in any mine where coal is undercut, overcut or sheared.

"(8) When practicable no shots should be fired when any men are in the mine. This can be avoided by electrical shooting from the surface. In any event, no shots should be fired until all persons except designated shotfirers have left the mine.

"(9) Shotfirers should be highly paid, experienced, conservative men, should have plenty of time to do their work well, should have a thorough knowledge of explosives, of gas, of dust, and of electricity, and should be required to have a certificate of competency after passing an examination covering these subjects, the certificates expiring at least every five years and being renewable only upon passing another examination.

"(10) All mines showing gas in any quantities should be termed gaseous mines, and approved electric safety lamps should be used in them.

"(11) Shotfirers should see that all shots are properly placed, and should have authority to reject all holes that in their judgment are misplaced. Your committee would recommend the encouragement of a system of drilling, tamping and shooting of all holes, by competent shotfirers.

"(12) Wherever water is available, sprinkling lines

ELECTRIC ARCS DANGEROUS ANYWHERE

TOO few people seem to realize the dangers of electric arcs in coal mines, the Rocky Mountain Coal Mining Institute believes. In its safety report, adopted at Rock Springs, it holds that all possible precaution should be taken against such flashes in mines both gaseous and non-gaseous. It was reported that two recent explosions occurred from electricity arcing into dust on main intake air courses, and that methane had practically no part in the resultant blasts which killed more than 200 men. In an outdoor demonstration at the time of the institute meeting the Bureau of Mines showed how likely transformers are to flash over when overheated, thus driving home the need for fireproof enclosures for all transformers underground.

should be installed and machine cuttings thoroughly wetted down. When practicable cutting machines should be equipped with water sprays on the entering side of the cutter chain. This is the safest way known to render dust inexplosive. When not possible to use water on cutter bars, it is essential that all machine cuttings be loaded out before shooting the working faces.

"(13) Mining machines should be used wherever possible as they have a tendency to decrease both major and minor accidents.

"(14) Employees should wear heavy shoes with a good stiff sole, as many accidents happen from the wearing of light shoes.

"(15) As many head injuries occur in mines, heavier caps should be worn; stiff fiber caps have been found to make excellent substitutes for the present caps worn by miners.

"(16) Whenever it is necessary to do so, trolley wires wherever men are working ought to be protected by two strips of wood, old hose, or canvas securely clamped to the wire. Accidents frequently happen from the neck or back of the head coming in contact with a live wire when repairs are being made near these wires. To prevent this, a piece of rubber or other nonconducting material should be fastened to the cap and extend to the shoulders. This should be detachable and worn only when the man is engaged in a hazardous occupation of the kind described.

"(17) Though dust alone furnishes the starting material for probably less than 20 per cent of our coal-mine explosions, it propagates nearly all of them and is probably responsible for much more than two-thirds of the loss of life.

"(18) Open lights have been the igniting cause of well over 50 per cent of our explosions; methane generally being the fuel, though under certain conditions coal dust can be ignited by the flame of a carbide lamp. Gaseous mines should be equipped with approved types of electric cap lamps.

"(19) Flame safety lamps, chiefly in the hands of firebosses or safety men, have caused several explosions with heavy loss of life; usually the lamps have been improperly assembled or otherwise have been misused. Before lamps are distributed they should be carefully inspected by a competent man. All lamps should bear the approval of the U. S. Bureau of Mines and should be magnetically locked before being issued.

"(20) All electric lines should be properly constructed and supported. Sectional circuit breakers should be installed every 2,000 ft.

"(21) Mine fires have been the source of several explosions, usually through interruption or reversal of ventilation and passage of methane into the fire region; consequently open lights should never be used in fighting mine fires.

"(22) As methane starts most of our explosions, all available precaution should be taken against its accumulation, a few being mentioned herewith:

"(A) Every mine should have mechanical ventilation, and if the mine is distinctly gaseous and employs any large number of men, it should have two fans or at least two distinct sources of power for driving the fan.

"(B) Mine fans should be operated 24 hours each day especially if the mine 'makes' gas.

"(C) Stoppings should be of tight and of durable material.

"(D) Where gas is generated at the working face, line brattices should be used from the last crosscut to the face.

"(E) Every large mine should have more than one air split; each split should be absolutely separate from all others, and each should have adequate volume of air to supply enough circulation at the faces to remove methane as it is emitted.

"(F) The mine should be ventilated without the use of many doors, and the doors necessary should be in pairs with an air lock between. They should be solid, tight and equipped to close automatically. All persons should be made to understand that doors must be kept closed as much as possible.

"(G) Where possible, workings should be in panels so as to confine the fire or explosion, if possible, to the panel in which is starts.

"(H) The ventilation should be under the direct supervision of some 'live-wire,' up-to-the-minute man, preferably with fair education and some technical training, and with much underground experience.

"(I) The driving of crosscuts in either entry or rooms, should be given the preference over the driving of either rooms or entries.

"(23) Coal dust seems to be explosive in proportion to its dryness and fineness and in proportion to the relation of volatile matter to volatile matter plus fixed carbon, the higher this quantity, the more dangerous the dust. Anthracite dust seems to be practically non-

On a Safe Slope

Group of Rocky Mountain Coal Mining Institute men on man trip descending into Reliance No. 1 mine to see rock-dust barriers and other safety devices as well as loading machines. The trip is equipped with an automatic safety grip which clamps on the rail whenever the rope goes slack.

explosive, whereas bituminous or lignitic dust may explode even when the moisture or ash is above 25 per cent and may propagate any explosion when incombustible matter (ash plus moisture) is over 60 per cent. A slight quantity of methane (1 per cent or over) in the air makes dust more explosive. Less than one pound of fine, dry, bituminous or lignitic dust per lineal foot of entry will propagate an explosion with violence. Dust larger than 20-mesh is thought not to enter into explosions, but dust of about 100-mesh is dangerous and if of 200-mesh or finer constitutes an extreme hazard. Much of the settled dust on rib ledges is finer than 300-mesh.

"(24) The formation of dust is prevented to a certain extent by the use of longwall instead of room-and-pillar mining, by use of more holes and less explosive per hole in blasting, by use of the hydraulic cartridge or some similar method of bringing down coal.

"(25) Strong ventilating currents may remove dangerous dust from working faces, but such currents rarely are found at the face. On the other hand, strong currents of dry air tend to abstract moisture from the coal, making the dust the more dangerous. Dust removed from moving cars by strong air currents later settles on mine surfaces, constituting a definite hazard. Where water is available, water sprays should be placed at convenient points so that loaded cars may be sprayed as they leave the branch entries.

"(26) Humidification of intake air by steam, etc., rarely adds moisture to mine dust but it does have the helpful effect of preventing dry intake air from abstracting moisture from mine dust. However, the large investment required to provide the requisite volume of steam will probably prevent the general adoption of humidification by this method.

"(27) Sprinkling of roadways with the water car is not effective as it does not touch the dry, fine, settled dust on timbers or rib ledges, this dust being the most dangerous found in mines. By means of a small centrifugal pump, mounted on a truck adjacent to the water tank water can be delivered under such a heavy pressure that the roof and ribs are wetted thoroughly.

"(28) If a hose is used continually and systematically to wash down the roof, timbers and ribs and to wet the floor of all adjacent workings, the wetting being done by men who have no other duties, it, in our opinion, will be safe and effective if the water lines are kept at or near the coal faces and hose is available to keep the face wet.

"(29) A sprinkling system as above described, cannot be used on intake aircourses where winters are cold, except where preheating is done, and can be used only at great expense for timbering, etc., where roof, rib or floor material would be badly affected by water.

"(30) Rock dusting is preferred by many explosion experts to sprinkling as a preventive of explosions. The rock dust cools the flame and quenches it whether the explosion is one of dust or of methane. Moreover, if sufficient rock dust is present, it will prevent ignition of coal dust. Rock dusting is compulsory in certain classes of coal mines in Great Britain.

"(31) The rock dust should be 100-mesh or finer; should have little or no combustible matter; should have little or no free silica, as that material endangers the health of those breathing it; should not absorb moisture, and should not tend to pack or harden when left standing.

"(32) Rock dust should be placed on the ribs, timbers, roof and floor of haulage and working places by hand or by machine, and rock dusting should be repeated when the percentage of incombustible in rib or road dust falls below the required quantity to make the dust non-ignitable. This percentage is generally about 60 but may be as high as 75 to 80 if the coal dust is very fine or very high in volatile matter, or if there is one or more per cent of methane in the air. The rib and road dust should be sampled and analyzed whenever it is suspected that the coal-dust percentage is getting high. Dust should be removed from the mine at intervals.

"(33) Rock dusting of ribs, roof and floor, as above described, should be supplemented by placing rock-dust barriers the purpose of which is to confine or limit an explosion which might get a start. At least a half dozen of these barriers should be placed in series in each location, and should be made in accordance with recommendations contained in Bureau of Mines Bulletins 20, 26, 56, and 167. Improperly constructed barriers are useless, but well-constructed and well-placed barriers have quickly stopped violent explosions.

"(34) Any mine owner having dangerous dust or wishing to know whether his dust is dangerous should get in touch with the U. S. Bureau of Mines through the Director, engineers of that bureau having made detailed study of coal-dust problems. Any mine official also contemplating the use of rock dust should get in communication with Bureau of Mines.

"(35) In our opinion mines having dangerous dust with or without methane should both use rock dust and sprinkle the workings with water, the mines being sprinkled as previously described, but where water injures roof, ribs, or floor, or where water is not available, or where the workings are so cold that water freezes, the ribs, roof and floor should be covered with rock dust and dust should be placed on well-constructed rock-dust barriers at the entrance of panels or long entries. Even where only a sprinkling system is provided, the barriers should be used, but they should be in a series of six or more at each location and should

SOME MINES NEED 80 PER CENT ROCK DUST

THE Rocky Mountain Coal Mining Institute is by no means satisfied that the commonly accepted "safe" proportion of 55 per cent inert matter in coal dust renders that dust non-combustible. It is all too familar with the highly inflammable, resinous and volatile Utah coal dust. Therefore, it declared, in the safety report it adopted Aug. 8, that the proportion of inert matter in mine dust should be 60 per cent in any mine where any reliance is placed upon rock dusting and 75 or 80 per cent where the coal dust is very fine and highly volatile. The institute is so impressed with the dangers of coal dust that it recommends not only complete rock dusting, including the use of properly constructed barriers but also careful sprinkling in mines making methane.

Car Designed for Safe Transport of Hay

Going the Institute safety code one better, the Union Pacific Coal Co. is safe even to the handling of its mule and horse feed. This hay car has both a top lid and a rear drop door to prevent chance sparks from dropping in and to prevent spillage en route.

be constructed and maintained in accordance with instructions in Bureau of Mines' Bulletins.

"(36) No electric equipment should be placed underground except that of permissible type where such is available. Wherever permissible equipment is installed, a definite and complete system of inspection should be instituted, to insure equipment remaining in a permissible condition.

"(37) All possible precautions should be taken against occurrence of electric arcs in coal mines whether gaseous or non-gaseous.

"(38) The fireboss should not be assigned any larger district than he can properly cover in three hours without undue hurry, and the latter part of his shift should be confined to his inspection duties. Any official showing signs of carelessness in enforcing the state mining laws should have his certificate revoked.

"(39) Safety inspection of all mines should be made at least annually by competent outside mining men, preferably a safety engineer, and where feasible, this might be attained by annual temporary exchange of inspectors between the companies operating in different coal fields in order to obtain benefit of an interchange of ideas. We believe the suggestion regarding the exchange of inspectors to be practical and would recommend its general use.

"(40) Where a local safety man is employed continuously, his reports should be made direct to the highest officials of the company and copies furnished to local officials. Local safety men should preferably be young, vigorous engineers of experience able to explore all workings and capable of reading and interpreting up-to-date technical articles on coal mining.

"(41) All underground officials should be required to carry a copy of the state mining law and to be familiar with its contents, and there should be posted in conspicuous places near every working mine, printed cards covering the provisions of the state mining laws concerning mine safety and also giving definite instructions to all workers about mines as to safety practices.

"(42) Miners rarely have any adequate idea as to what constitutes safety in coal mines, and this applies almost equally to the experienced miner and to the man who has worked in mines only a few months or a few years. To remedy this condition, an extensive campaign of education of miners should be instituted, and in this the mining companies should participate, getting aid from state and federal governments.

The mining companies should issue bulletins and letters on safety subjects, possibly have meetings at which safety is discussed or have local or outside speakers famliiar with mine safety address the mine workers, or have moving pictures with safety subjects illustrated.

The state and federal governments should have well-informed, conservative mining men available to go among miners to talk safety to them or to issue pamphlets descriptive in simple language of safety practices and methods in mining.

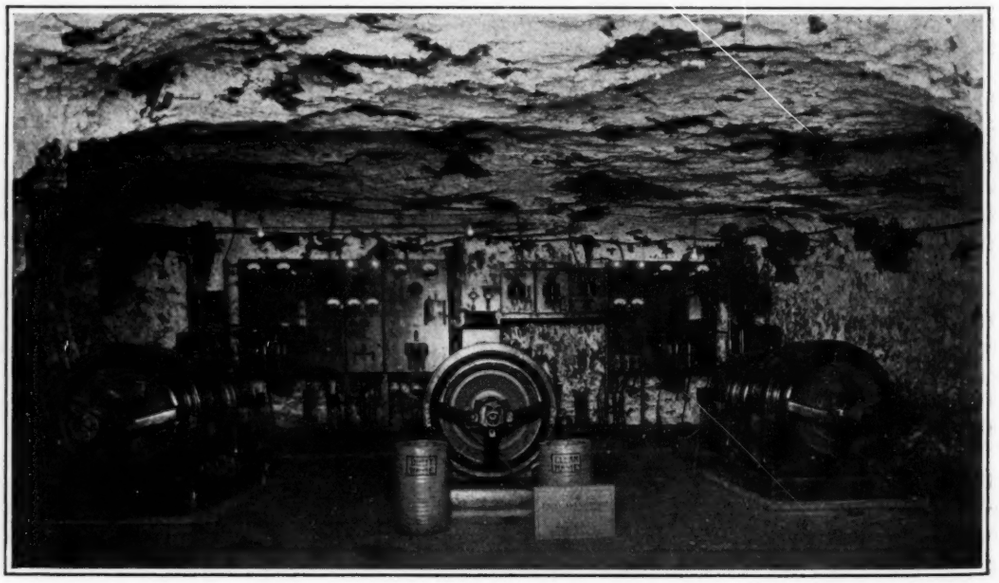
"(43) All ventilating fans should be equipped with pressure recording gages and mine foremen should examine them to determine whether ventilation conditions are normal before allowing men to enter the mine.

"(44) Safety signs calling attention to specific dangers should be posted in several languages at conspicuous places throughout the mine and kept in such condition that they may be easily read.

"(45) Underground stations housing pumps, hoists, motor-generator sets, transformers or similar equipment, should be thoroughly fireproofed, using concrete, gunite or similar material."

Protected Against Fire

Motor-generator set in Mine No. 1 of the Union Pacific Coal Co. at Reliance, Wyo. Not a stick of wood or other flammable material is used in this rock-and-concrete room. The doors are flameproof, making the whole a reasonably safe place.



Springfield High School Radio Club

School Boys Work Out New Radio System for Mines

Springfield, Ill., Club Transmits Voice Vertically Through Ground—Scheme May Be Great Aid in Rescue Work—Previous Radio Communication With Mines Needed Metallic Conduction

BY A. B. MCCALL*
Springfield, Illinois

A. B. McCall

INTEREST has been aroused by the successful experiments of the Springfield High School Radio Club in underground communication between the surface and the interior of a mine, where 250 ft. of soil and rock intervened; not that such communication was unprecedent, for some previous attempts had been successful, but in every previous case dependence at such depths had been placed on conduction by wires, pipes and rails. In this instance there was direct, vertical transmission, using only the ground as a conductor.

The experiments were made at the Woodside mine of the Peabody Coal Co., at the edge of the city of Springfield, Ill. It was the culmination of much enthusiastic experimentation by the Springfield High School Radio Club, which had been working for many months with the technical advice of Frederick C. Holtz, an electrical engineer, and under my direction.

Thus it was demonstrated that it is possible to talk through the ground to men in a mine no matter if every entry is blasted shut by an explosion and every wire or pipe or rail line so badly broken as to be worthless as an aid to radio communication. Something new had been done for the mining industry and the men in it—something that may prove of great value in the mine rescue work of the future.

The radio club succeeded in its attempt while it was making official tests for the U. S. Bureau of Mines. It had won recognition by the government as an official experimental agency co-operating with the bureau in mine radio because its work in conduction of T.P.S. signals and voice between mine interiors and the surface had been so efficient and because its reports had been so intelligent and comprehensive that they were considered valuable fundamental data for the bureau's information.

The bureau several years ago undertook a series of investigations along this line in order to determine a simple and practical design of apparatus which might

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be used for transmitting and receiving the human voice through the ground to and from deep mine interiors in cases of disasters where rescue work is in progress.

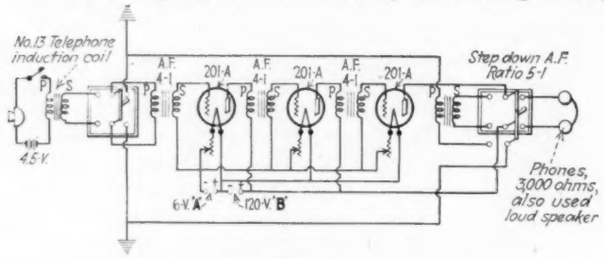
The popularity of radio and its many points of mechanical and electrical interest have led many people recently to undertake similar investigations and in consequence in the past year experiments of this character have been reported from many states in the union and many foreign countries.

The high school radio club of Springfield first achieved distinction in a series of experiments with radio in the nearby coal mines, where, in March, April, and May, 1923, it succeeded in sending and receiving both code signals and voice in and out of the mines from points a mile back in the mine interior and 250 ft. below the surface. Stories of its efforts in this connection were at that time published in a number of magazines and newspapers, and in the meantime reports of its experiments were submitted to the director of the U. S. Bureau of Mines by the president of the United Mine Workers of America, John L. Lewis, who personally volunteered an offer to co-operate with this club and the U. S. Bureau of Mines in any way that he could be of assistance.

It was then that the club won recognition from the bureau as an experimental agency. Following this recognition it was assigned the duty of gathering fundamental data concerning the conductivity of the soil and substrata lying between the coal seams and the surface in Illinois. When this assignment was made the club was lent experimental apparatus known as the T.P.S., or ground-telegraph, code transmitting and receiving sets.

The club completed a series of experiments with the apparatus lent by the Bureau of Mines, but while this was going on, the Club's experimental committee was quietly and systematically attempting to work out a plan to transmit the voice by ground conduction.

A series of investigations into mine radio conducted by the U. S. Bureau of Mines and other experimental agencies have, up to the present time, convinced engineers working on this problem that radio will be of limited usefulness for communicating underground in mine rescue operations. Some of the conclusions of the bureau engineers, after recently concluding a long



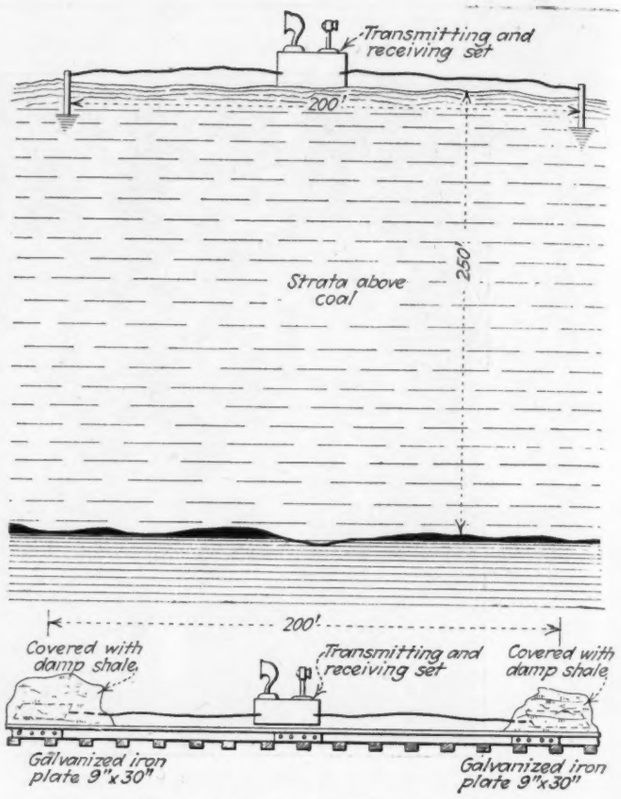
Circuit by Which Surface Spoke to Mine

This diagram shows the circuit used successfully, at Springfield, Ill., to exchange conversation vertically through the earth by ground conduction. No difficulty was experienced in conversing through 250 ft. of solid strata.

series of tests with radio in the mines about Pittsburgh, are, in effect, as follows:

First, radio waves will not penetrate through a sufficient thickness of earth strata to make radio practical for mine-rescue work without the aid of metallic conductors of some kind to act as a guide to the electromagnetic carrier waves.

Second, successes with radio even with metallic conductors, would be limited to the conducting qualities of



Section Shows Position of Surface and Mine Sets

The relation of the mine entrance to the surface station and the rescue station is immaterial as the currents pass through the solid strata and not through conducting media in the mine roadways. This shows the arrangement at the Woodside mine on April 27 when the successful experiment was made.

the metallic conductors, such as trolley wires, light circuits, telephone circuits, water pipes and mine-car rails.

Third, in the event of a cave-in or a mine explosion there is a great probability that the metallic conductors would get broken and perhaps grounded. This would reduce or destroy their ability to aid in communication with the underground workings just at a time when communication from the mine interior to the outside world might be most needed.

Realizing all these limitations the Springfield High School Radio Club attempted to find ways to overcome them and to devise a practical means of transmitting and receiving voice currents by ground telephony.

In this connection it will be evident that any method of communication for mine-rescue work will naturally have certain limitations, but the one big question to be considered is: Do those limitations make the system impossible for emergency use in mine rescue?

Of course, any method of communication with voice that would be simple to operate and easy to take care of should be as free as possible from interference from the natural elements, and anyone who has had any experience with radio is aware of the fact that in order to get any results with it, either in sending or receiving, not only does the operator have to learn to tune the apparatus but static and signal fading conditions tend to interfere occasionally and might do so at an unfortunate time for mine-rescue work.

As a result of the Bureau of Mines' experiments, J. J. Jakosky has discovered some of these limitations of radio but he observed that as long as metallic conductors exist in the mine, radio communication between the surface and points several thousand feet back may be moderately successful even though small breaks may

cur in the conductors. Metallic conductors merely act as guides to the radio carrier wave which carries the voice so that small breaks may be jumped.

It has been repeatedly stated by men of mine experience that any set of apparatus used for mine-rescue work should not have to be tuned like radio, should have some means of eliminating static, should be simple to operate, should work with reasonable certainty and without difficulty in the event of an emergency and should not ignite gases. In this respect we can hardly feel as yet that radio alone will fill the bill.

With this information the radio club, after a series of discussions in meetings of its experimental committee tried out its system at the Woodside mine.

The test was successful. The students were subsequently informed by engineers of the Bureau of Mines that so far as available records disclosed, the club is the first experimental agency successfully to transmit and receive voice currents vertically to and from mine interiors using the ground as a conductor.

When all factors are considered, which enter into the ground conduction method of voice transmission, it will be readily observed that for simplicity, for dependability of service, and freedom from natural interfer-

A Flashlight of the Experimenters in Action

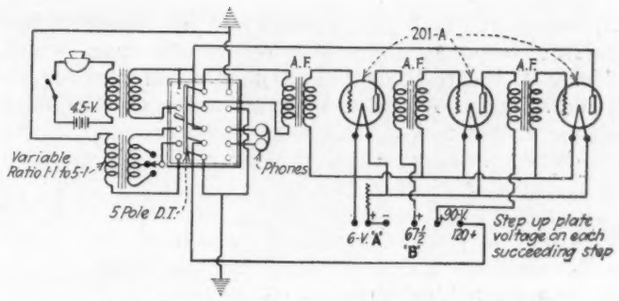
This group of radio club students actually heard the voices of those on the surface and talked with those above.

ences this system of underground communication may be expected to have many points of advantage over radio alone as a communicating medium.

For instance, this type of ground telephony, as will be noted in the circuit diagram, requires absolutely no tuning for success either in sending or receiving. It is further evident that the ground is likely to be a nearly constant conducting medium from month to month, especially if ground plates are buried to a reasonable depth below the surface soil to get away from the extremes of dampness and dryness.

The apparatus used by the radio club for vertical transmission of voice current consisted of a telephone transmitter with an induction coil with the line leads therefrom connected to the input of the first amplifier stage of a radio amplifying set. The voice current then passes through the desired number of stages of audio frequency amplification and passes out through the output connections and through a step-down audio frequency transformer (a 5-to-1 ratio being used with success) from which ground leads are taken by insulated wire to the ground electrodes which carry the voice current into the ground.

In permanent installations these ground electrodes preferably should be buried a few feet under the surface. Their distance apart depends upon the distance



More Compact Arrangement of the Circuit

This system, using three stages of amplification, has been devised for future experimentation.

that it is desired to send the voice currents through the ground, remembering that they can be sent practically from four to six times as far as the distance between the ground electrodes at the surface.

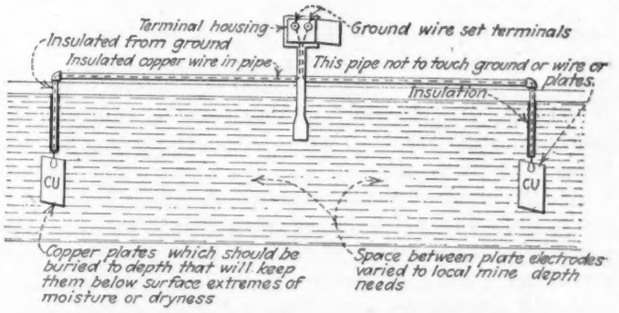
In the practical application of this system of underground communication it may reasonably be expected to operate successfully under conditions that have been suggested by mining engineers, mine owners and superintendents.

For instance, it should give good results in a mine having refuge chambers in each of several main divisions of the mine, a refuge chamber, for instance, in each of possibly four divisions, north, east, south and west.

An apparatus equipped for transmitting and receiving voice through the ground could be installed in each of the four refuge chambers, and there protected carefully from moisture accumulations. All battery terminals should be properly protected to avoid sparking. Each apparatus must have two ground electrodes connected by insulated wire to the set. These should be driven or buried in the roof or floor. Their distance apart should be equal to from one-fourth to three-fourths the depth of the mine, depending on the local conductivity of the sub-strata. The electrodes should be copper plates buried under damp loose shale or some such soil that is not too dry, or cemented in some manner securely within a slot in the roof to insure a good contact.

On the surface directly above each refuge chamber it would be practical to bury electrodes a similar distance apart, approximately 6 or 8 ft. beneath the soil and have them connected by insulated wire to a surface terminal housing as shown in an accompanying drawing. Such a housing would contain only the two terminal connections with the wires running to the buried electrodes.

It would then be practical for the mine office to be connected by relay or to have a portable apparatus which



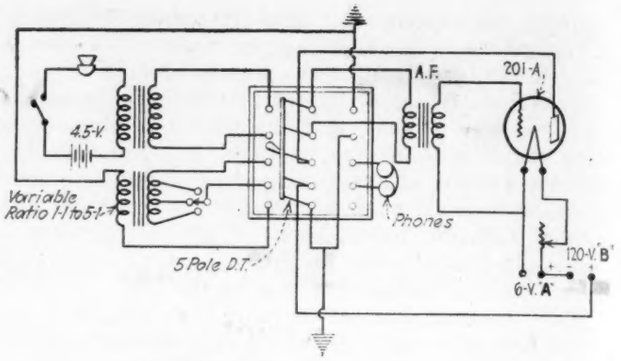
Suggested Method of Housing Surface Terminals

The plates are sunk to a depth sufficient to assure that they will be in strata unaffected by the sun. It is important to have conditions standard, if possible so that no manipulation of the receiving instruments will be necessary.

in the event of an emergency could be rushed to the surface terminal above the refuge chamber, which houses the entombed men, and terminal connections made at once. A push button opens the circuit and a simple switch makes the change from transmitting to receiving. Miners entombed could easily talk to those at the surface set and vice-versa.

In the experiment conducted by this club, April 27, 1924, at the Woodside mine at Springfield, this is exactly what did happen, except that the experimenters below were not entombed.

This type of apparatus could save valuable time in case of disaster if the man leading the rescue party would station himself at a point near the rescue operations, bury the electrodes and with his set, weighing about 29 lb., communicate directly with the surface instead of using messengers.



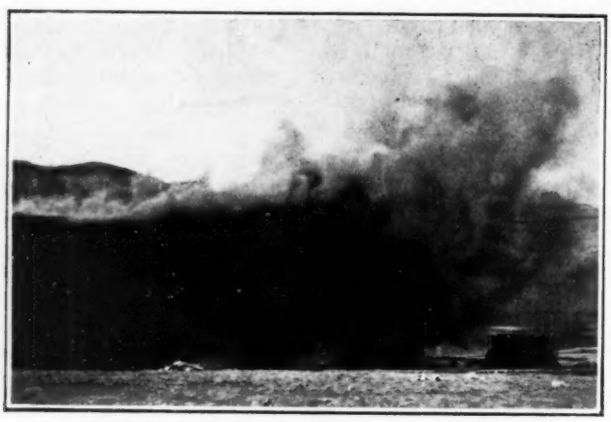
Ground Telephone Circuit in Simplest Form

Here only one amplifying tube is used. Any good amplifying tube may be used for this purpose. On all the arrangements in these several illustrations patents are new pending.

What Happens When a Coal Mine "Goes Up"?

Bureau Men Show Crowd At Rock Springs, Igniting Dust Both by Electric Arc and Blown-out Shot—Transformer Smokes Too

AT THE Wyoming state first-aid and mine-rescue meet, held at ock Springs, Wyo., Aug. 9, the Bureau of Mines demonstrated effectively what happens when an electric arc or a blown-out shot ignites coal dust, and what does not happen when the coal dust has been rendered immune from explosion by admixture of rock



Arcs and Coal Dust a Dangerous Combination

This explosion, inside the gallery which had just been used in the Wyoming state rescue contest, proved that point to the crowd, a block away across Rock Springs First Aid Park, Aug. 9.

or adobe dust. Also, evidence was shown that a transformer should not be left unprotected in a mine.

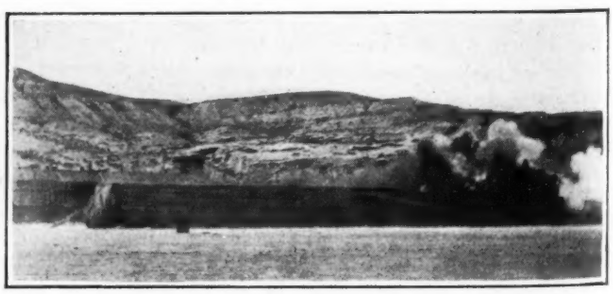
The first act of the show was the ignition of coal dust by an electric arc. A long wooden gallery, that had been used for the rescue contests, served as the "mine." In it an electric arc was obtained by pulling a circuit breaker on average mine voltage. Twenty-five pounds of fine coal dust were blown over the arc made by the opening of the circuit breaker. The result was a great flash of smoke and flame as the coal dust exploded, simulating what happens when an arc occurs in an atmosphere containing coal dust in suspension. Water from a fire hose saved the gallery for the rest of the show.

Next, the arc was pulled just after another 25 lb. of dust had been blown into suspension within the gallery; but in this case the result was different. The dust was 60 per cent adobe and only 40 per cent coal. Nothing happened except a little flash of the arc and a rolling, but harmless cloud of dirt from the mouth of the gallery. The adobe had stopped the "mine explotion."

Meantime two 440-volt, 10-kw. transformers with their secondaries shorted in plain sight of the audience, heated up dangerously and emitted clouds of smoke from the boiling oil within them. However, the flash-over always likely in such cases, did not occur, but the mining men got the idea just the same. Transformers have dangers like most other electrical apparatus. They should be kept off the intake airways in mines and should be housed in flameproof stations with self-closing doors, and otherwise protected.

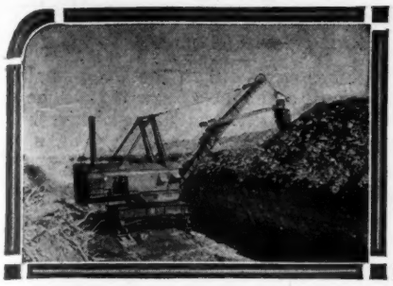
The finale was a whooping blast which blew the gallery to pieces and sent up a frightful cloud of flame and black smoke. It was a dust explosion caused by a "blown-out shot." The gallery was loaded with fine coal dust on rafters and shelves just as coal dust accumulates on roof and ribs in a mine entry. Then a cloud of it was blown into suspension just as a small cannon at one end of the gallery fired a spurt of flame. The result was satisfactory to everybody concerned. The gallery disappeared.

This picturesque demonstration to teach the lessons of mine safety, was the first of its kind ever held in the West.



Wham! Up Goes The Whole "Mine"

In this case, fine, dangerous coal dust was not only piled through the gallery just as it accumulates in a real mine entry, but 25 lb. were thrown into suspension. A little cannon fired the "blown-out shot." The instant after the picture was taken the gallery "went west." At this instant the end where the shot was fired was being blown to pieces and the air blast through the gallery had just begun to blow out the burlap curtain at the other end.



News Of the Industry

C. P. White Expected to Prove Big Asset To Government Coal Division

Broad Experience in the Industry Will Be Helpful in Building Up Export Business—Enjoys Full Confidence of the Trade—Assumes Duties This Week

By Paul Wooton
Washington Correspondent of *Coal Age*

Under the immediate direction of C. P. White, the new head of the coal division of the Bureau of Foreign and Domestic Commerce, the great influence of the department and the use of its far-flung facilities are to be employed in an effort to be helpful to the American coal industry. As is known generally, Mr. White's circumstances are such that he can accept public service with only secondary regard for the salary. Because of that fact the department has added to its staff of commodity specialists a more capable man than ordinarily would be attracted by the government's idea of technical salaries.

Mr. White needs no introduction to the American coal trade. He has been associated with the coal business since he left high school. The fact that he has been called upon on a number of occasions to serve as a member of scale committees gives an indication of his detailed knowledge of the business. As a young man he was connected with the coal department of the Wheeling & Lake Erie R.R. Later he was connected with coal-dock operations at Superior, Wis. At one time in his career he was manager in the Northwest for the Pittsburgh Coal Co. He served the Carnegie Dock & Fuel Co. at another time in the same capacity. He has been prominently associated with the activites of the Pittsburgh Vein Operators Association. As general manager of the Clarkson Coal Mining Co. he acquired practical experience in the operating end of the business. His familiarity with the situation in the Northwest and in Canada resulted in his being chosen to direct that important distribution for the Fuel Administration. In similar fashion he was called upon to handle the Northwestern distribution when the federal government took a hand in the situation following the strike in 1922.

Because of his long association with the business and his wide acquaintanceship among the producers and distributors of coal, he undertakes his work with the important advantage of enjoying the full confidence of the industry. While he has some very concrete ideas as to the assistance which the department can extend to the coal industry, he will recommend no program until he has conferred with the industry. He believes the suggestion as to the steps which would be most helpful just at this time should come from industry rather than from the coal division. At the same time Mr. White realizes that were he to sit in his office and wait for suggestions to come in a considerable portion of them would come from those who have axes to grind. To get a real cross-section of the more urgent needs of the business, Mr. White believes it will be necessary to obtain this information by personal contact when ideas can be drawn from a man who is too busy to write them in or who fears that his motive might be misinterpreted.

Government Activity Resented

In certain quarters there is a feeling of resentment aroused by any activity of the federal government which has to do with coal. This has its origin largely in the fear that the government will seek in some way or other, eventually if not now, to interfere with the normal conduct of the business. No such apprehension is justified in connection with the activities of the Department of Commerce, at least.

In the matter of increasing our exports of coal Mr. White entertains no dream of sudden expansion. While he realizes that we do not occupy an advantageous position to compete in the world's coal markets, nevertheless he thinks American genius for organization, backed by the country's capital resources, should find a way to increase our exports of coal. He points out in that connection, however, that progress in that direction will be slow and beset with many difficulties. Since much more is involved than the sending out of salesmen to take orders, Mr. White feels that there should be concentration on this problem by the best minds in the industry. He admits that our overseas coal trade cannot be increased greatly beyond its present dimensions without correlating this trade with other enterprises, which in most cases would involve large capital outlay.

While Mr. White's assumption of his duties at the Department of Commerce was the matter of immediate interest in Washington this week, there is another development which may take more definite form in the near future. Those who are directing the Republican campaign and those who are serving in a similar capacity under the banner of the Democratic party are much concerned over the discontent among mine workers who are out of employment. They fear that many of these men are likely to vote for Senator La Follette. The concern seems to be greater among the Democratic leaders. It is their impression that the loss of this vote will hurt their party more than the Republicans.

The Republicans, however, do not concede that a majority of these men are normally Democrats. They point to the fact that John L. Lewis is regarded as a leader in the Republican party. His name was discussed seriously in connection with the Vice-Presidential nomination. Many other leaders among the mine owners are known to be affiliated with the Republican party and it is contended that their political convictions are shared by many of the mine workers. However that may be, each of the old parties is very anxious to suggest something that will increase employment in coal mines. Some are of the opinion that the situation in such doubtful states as Indiana and Ohio might be helped materially were the United Mine Workers induced to accept a lower wage scale. It is known that such a suggestion would be spurned by the leaders of the mine workers, but some are of the opinion that the rank and file of the union might be influenced to bring enough pressure on them to cause them to call another conference.

Besson Passes Test and Is Reappointed

Leon Besson, who was appointed state mine inspector of Kansas April 1 and removed on July 12, was restored to the position Aug. 18 after passing an examination for the post. An ouster suit was brought against Besson on the ground that he had not qualified by taking the inspector's examination before the state mining examining board. The court held that the inspector is required to take the examination. The Industrial Court, which appoints the inspector, then removed Besson and designated Ernest Shaw, deputy, to act as inspector. Besson took the examination Aug. 16, passed with a high rating, and his reappointment followed.

Home Trade Unsettled, British Producers Keen on Export Business

Nearness to Continent, Long-Established Connections, Large Supply of Ships and Low Freights, Says Hutchinson, Are Obstacles to American Headway in European Markets

Philadelphia, Pa., Aug. 26.—"The report made by the David Lloyd George committee, professing to be against the nationalization of British coal mines but recommending governmental ownership of the coal and the leasing of the mining rights, is generally regarded in England as a political document," said S. Pemberton Hutchinson, president of the Westmoreland Coal Co. and also president of the National Coal Association, in an interview today. Mr. Hutchinson, with several members of his family, returned from a six weeks' trip to Europe, having visited England, Wales and France. While abroad he took occasion to sound out mine owners and other business people on the British coal situation. Mr. Hutchinson's statements on conditions in the British coal industry were elicited in response to a series of questions propounded to him, as follows:

What is the present condition of the British coal industry?

"The British coal situation is not good. The iron and steel trade in Great Britain is in a depressed condition, over one-half of the blast furnaces being closed down. This being a basic industry, its condition naturally is reflected in that of the coal industry. As a result of that condition there is a very light local demand for British coal. Thus the British colliery owners are giving special attention to the export business. Their nearness to the European market, their long-established connections, the large amount of ocean-going tonnage and low ocean rates all contribute to the strengthening of their export business and prevent, in my opinion, American coals from gaining much headway in European markets at this time."

What effect will the general increase in wages under the recent settlement in England have upon the ability of the English coal operator to compete in the world's markets?

"The new wage agreement has not been in operation a sufficient length of time to enable anyone to determine how it will work out. It is my belief, however, that it will have but little effect upon the export business. I think the English operators will strive to expand their export business, even though they make very little money out of it."

What in your opinion will be the effect of the Ruhr settlement on the world's coal markets?

"It ought to help the coal markets of the world, because it will make for commercial stability. It is believed that the adoption of the Dawes plan will result in a more prosperous and stabilized condition of all the nations of the world, thereby increasing the consumption of coal."

What suggestions have you for furthering the American overseas coal export trade?

"I suggest that the American coal exporter can materially improve his standing in European markets if he will continue to advertise American coals abroad and send cargoes for introduction into the markets of the world, primarily with the view of establishing the coals rather than making much immediate profit on the transactions."

How do the housing and living conditions of the British miner compare with those in this country?

"The housing and living conditions of the miners in Great Britain are by far worse than they are in the United States. This opinion is based on my own observations and is corroborated by statements and descriptions contained in the report of the Lloyd George committee."

How is the report of the Lloyd George committee on the coal situation regarded by the industry?

"It is looked upon as a purely political document and its recommendations are opposed by both operators and miners."

In a recent analysis of the British coal situation English coal distributors stated that the fundamental problem in the industry was regularity of demand and that all other problems would be corrected if demand were stabilized. Does this seem to be the general opinion among thinking people in Great Britain?

Workable Stabilization Plan Lacking

"Yes; those who have studied this subject seem to be of one accord, but so far no one has been able to devise a plan of stabilization that is practicable or workable. It is my opinion that they will not be able to do so, because in order to stabilize the demand for coal it would be necessary to compel every user of coal to make his purchases at fixed times. This form of regulation would be contrary to sound economic laws and I do not believe it would ever be successful."

The Miners' Federation of Great Britain is advocating complete unionization of the mines and has taken steps to have a bill introduced into Parliament making membership in the federation a condition precedent to employment. Are the British coal-mine owners taking this proposition seriously?

"I do not think so. From my observations I would say that this is a political move, and apparently the mine owners do not anticipate the enactment of the bill."

During the course of Mr. Hutchinson's interview he took occasion to state that since his return from abroad he has become convinced that the coal trade in this country is on the upgrade, his belief being predicated on increasing inquiries about coal and future contracts, as well as increasing output.

Coal Stock Report Sept. 1

After some effort, the Geological Survey and the Bureau of the Census have found money enough to take a coal stock report as of Sept. 1.

Big Merger of Hard-Coal Independents Planned

The consolidation movement apparently is about to spread to the anthracite field, a special dispatch from Scranton, Pa., stating that another big hard-coal producing organization that is expected to be a competitor of such companies as the Hudson and Glen Alden is in process of formation. A group of independently operated collieries and mines are to be merged to form the new organization. All companies mentioned are large producers of anthracite.

A group of Pennsylvanians, among whom are mentioned Wm. C. Sproul, former Governor of the state, and Newton D. Jackson, of Philadelphia, are said to be promoting the enterprise. Among the independent coal companies which may be affected by the merger are the Temple Coal Co., the East Bear Ridge, the Scranton Coal Co., the Legitts Creek company and several smaller producers.

A definite move toward the consolidation was manifested clearly over the week-end with the visit to Scranton of former Governor Sproul, whose name has been linked with the promotion of such a merger for some time. A report that bears the weight of authority has it that the former Governor, while in Scranton, completed negotiations for the purchase of the Traders Coal Co., an independent producer, with offices in Scranton. It is known that Mr. Sproul was in consultation with officials of the Traders company.

For some time negotiations have been in progress to buy the coal properties with a view to merging them into one corporation with resources of capital and combined output sufficient to give the stock or bonds contemplated for issuance a high financial rating on the market.

Farrell Coke Plant Closes as New Clairton Ovens Open

The Carnegie Steel Co. coke plant at Farrell, Pa., was closed Aug. 22, and it is likely that it will never be reopened. The three batteries consist of 212 ovens, but only 50 have been in operation, due to the idleness of two of the three blast furnaces. Whether the plant will be dismantled is not known.

The closing was brought about by the starting of the big byproduct plant of the company at Clairton, Pa. The latter is in position to ship both coke and coal tar for fuel to Farrell at low cost. For the present blast furnace No. 2 will be operated on stock coke.

Tar from the Clairton works also will be used for fuel in the open-hearth furnaces at Farrell.

For the first time since the open-hearth furnaces were built all of them will use coal tar.

Coal Production on Competitive Basis Is Central Pennsylvania's Need

Operators Decry Advantage in Low Production Costs Enjoyed by Non-Union Districts Because of Lower Wages—West Virginia Gaining Despite Depression in Union Districts

"The most important matter discussed at the meeting of the coal operators held in Altoona, Pa., Aug. 22," according to a statement by Charles O'Neill, secretary of the Central Pennsylvania Coal Producers' Association, "was the business situation. The depression in the central Pennsylvania coal field is more acute than in other coal-producing fields. This is due, of course, to the high wage scale obtaining in the union districts. The non-union fields are working on greatly reduced wage scales and are taking the business. The wage scales in the non-union fields permit them to produce coal 50c. to $1 per ton less than in the union district of central Pennsylvania.

"The number of idle mines in this district, and the working time of the others is as follows: Mines idle, 652; mines working 1 day, 79; mines working 2 days, 85; mines working 3 days, 74; mines working 4 days, 65; mines working 5 days, 44; mines working 6 days, 63.

"In order to offset the reply that non-union fields are having the same troubles today, due to the general business depression of the country, as the union fields are having, I wish to quote a few figures showing comparison between our district and the non-union fields of West Virginia, showing the cars of coal loaded in each section from Jan. 1, 1923, to July 19, 1923, as compared with the car loadings for the same period of 1924: Non-union, West Virginia, 686,154 in 1923, 759,294 in 1924; central Pennsylvania, 502,022 in 1923, 367,613 in 1924.

West Virginia Catching Up

"The non-union mines of West Virginia gained in production this year 11 per cent. Central Pennsylvania has lost in production 27 per cent. These are the facts.

"The mine workers in their published statements rely upon the reports of the U. S. Geological Survey. These reports are accurate as to the mines that are in operation. They do not cover, for instance, the 652 idle mines in our district. The actual car loadings are the only real measure of one section against another.

"The miners' leaders agree to the proposition that there are 200,000 too many men in the industry and too many mines. The present policy means that the 200,000 men who must leave the industry must be union miners, and the invested capital in the excess mines to be wiped out must be the capital invested by union operators. High wage costs now have the union mines at a disadvantage of 50c. to $1 per ton in cost as compared with their competitors.

"There is only one cure for the present situation. If prosperity is to return permanently to this section its basic industry, coal, must be put upon a competitive basis. The union miners, if they propose to remain in the industry, must bear their share of the cost of the 'struggle for the survival of the fittest.'

"The serious questions involved in this issue were a matter of discussion at the meeting Aug. 22. It also will be a matter to be considered at the annual meeting of the operators to be held at Altoona on Sept. 5, 1924.

"The district officers at the miners' union assert that they are helpless in the matter, and that the present policy of supporting a high wage scale in the union fields and a low wage scale in the non-union fields is due to the international officers. In the meantime miners suffer, and operators and business men of this section face bankruptcy."

Move to Prevent Denial of Civil Rights of Miners

As part of a movement launched to improve conditions and to "stop the denial of civil liberties" in the soft-coal fields the American Civil Liberties Union, 100 Fifth Avenue, New York City, has sent a circular letter to hundreds of attorneys, ministers and officials in the non-union soft-coal districts.

"The suggested action," says the announcement, "includes the incorporation of the company-owned coal town; a fight against the so-called 'yellow-dog' contracts under which miners are prevented from joining unions, and efforts to have deputy sheriffs and local law-enforcing officials paid entirely by the county instead of by private coal corporations. Suggestions also are made for contesting injunctions which deny miners the right to organize and hold meetings, to strike and to picket. The districts chiefly affected are western Pennsylvania, West Virginia, Alabama and Utah."

The U. S. Coal Commission is cited in the announcement as authority for the statement that the domination of those districts by the coal companies is responsible for the "practical abridgement of free travel, free speech and public assemblage," and for depriving miners of "their normal rights."

These findings, according to the Civil Liberties Union, "will go their way into the archives like other government reports unless somebody gets busy to put them into effect. That we conceive to be our job. We are opening a campaign in the non-union soft-coal districts which we trust will result in restoring those communities to the exercise of the ordinary civil rights of American citizens."

The Civil Liberties Union plans to organize committees in the districts affected to work for the Coal Commission's program, and to carry on an active agitation in the localities and the state legislatures.

Atlantic Coast Line and L. & N. Approve Clinchfield Lease

Officials of the Atlantic Coast Line and the Louisville & Nashville R.R., following simultaneous meetings in New York City, announced Aug. 21 that they would go ahead with their plans for the acquisition by lease of the Carolina, Clinchfield & Ohio Ry., subject to the terms and conditions imposed by the Interstate Commerce Commission in its recent authorization order.

The conditions laid down by the commission included the following:

Applicants must maintain the Carolina, Clinchfield & Ohio as a separate corporate entity and shall maintain a separate organization for the combined properties of the company, with a responsible operating management directly in charge; existing routes and channels of trade heretofore established by other carriers in connection with the Clinchfield must be preserved; the applicants must permit the line of the Clinchfield and its subsidiaries to be used as a link for through traffic via existing gateways of interchange, or via gateways to be subsequently established under authority of the commission by means of connecting lines proposed to be built by the Louisville & Nashville.

The application of the Atlantic Coast Line and the Louisville & Nashville calls for a 999-year lease, and this term is approved by the commission, dating from May 11, 1923.

The lessors are called upon to file within six months with the commission an application to build connections between the McRoberts and Harlan lines of the Louisville & Nashville and the line of the Carolina, Clinchfield & Ohio.

F. G. Hatton Takes Over Two Kentucky Mines

F. G. Hatton, president of Hatton, Brown & Co., Inc., Columbus, Ohio, announces that his company has taken over two large producing properties in the Betseylayne field on the C. & O. R.R. in Kentucky. The properties were taken over by the Peerless Elkhorn Coal Co., a $150,000 corporation, of which Mr. Hatton is president. The properties are the St. Paul Coal Co. and the Big Elkhorn Coal Co., with combined holdings of 900 acres and two operating mines. The ouput of 500 tons daily will soon be doubled and extensive improvements will be installed. The product will be marketed through the Hatton-Brown Co.

Conference May Amend Scale In Pomeroy Bend Field

Arrangements have been made for a conference of operators' and miners' representatives which will be held at Minersville, Ohio, soon in an effort to arrange an amended wage scale for the Pomeroy Bend field. The conference will consist of all operators in the Pomeroy Bend field. Many of the mines of the district are idle and it is hoped that concessions in the cost of production can be obtained in order that some of the mines can operate.

National Safety Council To Hold Its Annual Meet In Louisville, Kentucky

Expectations are that the Thirteenth Annual Safety Congress of the National Safety Council at the Hotels Brown and Seelbach, Louisville, Ky., Sept. 29 to Oct. 3, will be the best yet held. The first edition of the program has just been issued by headquarters at 168 Michigan Ave., Chicago. The opening session will be held Monday at 10 a.m. in the Hotel Brown with the president of the Louisville Safety Council, the mayor of the city and the president of the Chamber of Commerce of the United States among the speakers.

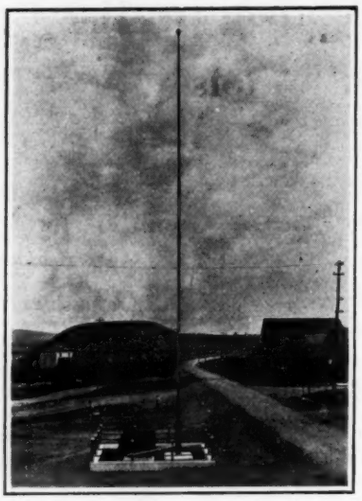
In the afternoon at 2 o'clock the Secretary of Labor will speak on the "Fundamentals of Our Industrial Safety Program," Dr. Arnold L. Jacoby, director, psychopathic clinic, Detroit, Mich., on "Mental Causes of Accidents," Jamie Heron, of Chicago, on "Building Men for Safety," and A. W. Whitney, chairman, American Engineering Standards Committee, on "Standardization of Safety Codes." A motion picture, the new industrial film of the National Safety Council, "A Word to the Wise" will then be presented.

To Show Safety Developments

On Tuesday morning at 10 o'clock the Mining Section will hold its first session with the addresses of the officers, an address by E. E. Jones, electrical engineer, E. E. White Coal Co., Glen White, W. Va., on "Stray Electrical Currents, Their Dangers and Avoidance." C. L. Colburn, who has been travelling extensively, will deliver an address on "Safety Kinks," and W. W. Adams, U. S. Bureau of Mines, Washington, D. C., who has been collecting detailed statistics from members of the Mining Section, National Safety Council, will present summations of those statistics, giving no details, however, as to individual companies. On Tuesday afternoon C. E. Pettibone, vice-president and manager, Engineering Department, American Mutual Liability Insurance Co., Boston, Mass., will show one hundred new slides from photographs contributed by members of the National Safety Council, showing new outstanding developments in safeguarding.

At 10 o'clock on Wednesday morning N. S. Greensfelder, editor, *The Explosives Engineer*, Wilmington, Del. will discuss "The Safe Use of Explosives"; Francis Feehan, U. S. Bureau of Mines, Pittsburgh, Pa., will give an address on "Organizing the Mining Industry for Safety," and J. B. Johnston will follow with an address on "Safety in Underground Use of Electricity."

Thursday morning will see the third session of the mining section with G. F. MacWilliams, electrical engineer, Pennsylvania Coal & Coke Corporation, Cresson, Pa., discussing "Electrical Starting Apparatus from the Viewpoint of Safety"; and probably R. N. Hosler, superintendent Pennsylvania Compensation Rating & Inspection Bureau, "Schedule Rating for Compensation Insurance." This will be followed by a round table discussion.



Unique War Memorial

Five-ton block of coal placed in front of the Lattimer (Pa.) office of Pardee Brothers & Co., Inc., as a memorial to the company's men who took part in the late war. It bears a tablet with the following inscription: "Memorial to the Employees of Pardee Bros. & Co., Inc., World War, 1917-1918." The enclosure is about 18 ft. square and the flagpole is 80 ft. high.

Crossed Wires Cause Fire In Ohio Coal Mine

Special to *Coal Age*

Columbus, Ohio, Aug. 23.—Crossed wires in the Lincoln mine of the Lorain Coal & Dock Co., located near Bridgeport, Belmont County, Ohio, caused a fire late Aug. 22. A portion of the workings were closed up to stifle the flames and it will be a week or ten days before it can be opened and the loss definitely acertained. In the meantime the loss in output will be about 500 tons daily, as it was one of the smaller operations of the company. It was not necessary for the mine rescue car to be called as there was no loss of life or injury to workers.

Kansas Open-Shop Miners Join the Union

Employees of three open-shop mines near Scammon, Kan., accepted with alacrity an invitation delivered personally, Aug. 19, by more than 1,000 union miners, to cease work until they might be admitted to the United Mine Workers. The mines affected were the Mackie J., a co-operative mine, operated by twelve men and employing forty-five; Mayer No. 11, leased and operated by Overjohn Brothers and employing forty-two men, and the Stocker mine, operated by George Mertz and employing thirty-seven miners.

Orient No. 2 Resumes Work

Orient Mine No. 2 of the Chicago, Wilmington & Franklin Coal Co., Herrin, Ill., has resumed operations, after having been idle since July 16. The strike was the result of a controversy between the company and men over the scale for undercutting machine men. Three hundred men are now at work.

More Glen Alden Mines Close Because of Card Strikes

Special to *Coal Age*

Scranton, Pa., Aug. 27—In an effort to impress upon the minds of alleged insurgent union leaders the futility of unauthorized, contract-breaking strikes at its collieries, the Glen Alden Coal Co. has evidently adopted a policy of closing down operations indefinitely after outlaw strikes have been put into effect by the men at the workings.

During the week the Hallstead colliery at Duryea, near here, employing 200 men, was shut down when the miners declared a strike after one of the employees refused to show his working card to a union official. After a day of idleness the men decided to return to work, but the company in the meantime had taken action. The fires were pulled and power shut off. Everything was placed in a condition for a long shutdown and the miners were told that the company had called off operations and the mine would remain closed for an indefinite period.

Similar action was taken at the Woodward colliery, at Edwardsville, about a month ago, with the result that the 1,800 men employed there have been on the idle list for more than four weeks and will continue to remain so for some time to come. Repairs are now being made at the Woodward colliery.

The frequency of outlaw strikes, it is understood, has resulted in this mode of procedure by the company officials.

Wants Pittsburgh Rates Cut, Others Raised

Under the arrangement in the Lake Cargo coal case August Gutheim, on behalf of the Pittsburgh Coal Producers' Association and other complainants, has submitted to the Interstate Commerce Commission a digest of the testimony on which his argument, to be submitted later, will be based. In submitting the digest of the testimony to the commission, Mr. Gutheim makes the point that the Pittsburgh rate of $1.66 should be reduced to $1.26 and at the same time points out that the differential from the Fairmont, Kanawha, Thacker, New River and Pocahontas districts, the so-called preferred districts, should be increased, when due consideration is given the commercial and competitive situation. He presents evidence to the effect that Pittsburgh has lost some 40 per cent of its lake business, while the preferred districts have been gaining. In 1912, when the commission reduced the Pittsburgh from 88c. to 78c., it was pointed out that the latter rate still was too high when measured by the cost of service. At the same time the Norfolk & Western was authorized to increase its rate. The B. & O., the C. & O. and the New York Central, however, made no attempt to justify a rate increase, with the result that the Norfolk & Western could not apply it.

Since that time Pittsburgh rates have been increased 115 per cent, whereas the southern district rates have been increased only 90 per cent, thereby aggravating the situation still further.

Herrin Mass Meeting Finds No Cure for Ills of Southern Illinois

Union Men Fail to Attend and Operators Recount Handicaps Imposed by Inelastic Wage Scale—Miners Insist on Maintenance of Present Contract

"Illinois mines are idle not because of a business depression or because coal substitutes are being used but because coal from other fields is going where Illinois coal formerly went," declared Dr. F. C. Honnold, secretary of the Illinois Coal Operators' Association, at a mass meeting held at Herrin, Ill., Aug. 20. "The output of the mines of Illinois has failed lamentably to show normal consecutive growth during the past dozen years."

The meeting was held under the auspices of the Lions Club in an effort to bring about the rehabilitation of mining in southern Illinois, which is suffering from all the economic ills that a general shutdown and unemployment in its main industry naturally would bring about. The coal operators and state officials of the United Mine Workers were invited to be present prepared to set forth all angles of the case. The union miners, who were held responsible for the present depression by both the coal operators and the railroad officials, failed to attend the conference, but in a letter made public just before the meeting reaffirmed their determination to maintain the present wage scale until its expiration in 1927.

Faint Hope of Resumption Soon

The conference indicated that there were scant hopes of resumption on the part of the operators. Dr. Honnold and several operators with large mines in this vicinity declared that orders for Illinois coal were steadily declining and that even Chicago customers of long standing were finding it cheaper to pay the heavier freight rates on non-union coal from Kentucky and West Virginia than to buy southern Illinois coal mined under the scale ratified at Jacksonville. "So long as the present scale persists we will observe the scale, but our mines will have few orders," the operators said.

There is no reason to expect, Dr. Honnold declared, that the annual output of Illinois mines for the next five years will exceed 60,000,000 tons a year (the prewar output), in spite of the fact that the bituminous coal consumption of the country has increased 20 per cent since 1912. If Illinois kept pace with other fields she should average 80,000,000 tons a year. This condition holds in spite of the fact that one-sixth of the bituminous coal production of the country is consumed in Illinois.

Handicapped By High Costs

"Today the mines of Illinois furnish less than half the coal requirements of the state because the cost and consequent price of Illinois coal is too high. More than 50 per cent of the daily production of bituminous coal in the United States is coming out of mines where it is produced at a cost only slightly over half the cost of similarly circumstanced Illinois mines. Part of this lower cost at competing mines is due to lower wage scales, part of it is due to more favorable contract and working conditions under the wage agreement, and part is due to the rapidly increasing use of mechanical devices and changed methods of mining."

Non-union mines are operating on the wage scale of 1917, Dr. Honnold declared, while Illinois mines pay $1,25 a ton above the 1917 scale, which was higher than that of the non-union fields. "That differential permits competitors to pay the heavier freight rates to the Chicago market and undersell Illinois coal," he said. "We will have difficulty in regaining those customers and because of our non-elastic agreement with the union we must continue the present scale for three years. The industry loses from $10,000,000 to $12,000,000 a year on screenings because of union restrictions—a burden which must be borne by the prepared sizes of coal.

Inelastic Scale Limits Work

"The operators are not opposed to unionism and they expect to continue to deal with the miners' union, but they feel bound to point out that refusal to accept a wage reduction does not guarantee daily earnings or annual income at demanded high levels when an ample and adequate fuel supply is readily available elsewhere.

"To insist that a non-competitive wage rate shall be written into the contract simply means greatly reduced work time for those who do have some work time and entire idleness for many others and a constantly growing decrease in production, all of which is much worse than a flat wage reduction, since it affects not only the mine owner and the mine worker but is against the interest of every mining community, of every industry and of every household and other consumer of coal in the entire state."

A similar note was sounded by Herbert Taylor and E. C. Searle, large coal operators in southern Illinois. Walter W. Williams, Benton attorney, appealed to the rank and file of the miners' union to insist on a wage reduction, "so that the mines may resume operation and this community not revert to the deserted farming village it was prior to the discovery of coal here thirty-two years ago."

The other side of the picture is given by George Stanfield, city editor of the *Herrin News*, who said that conditions are not as bad as they appear on the surface and that if the mines resume operation the community will soon be on its feet. Albert J. Nason, of Chicago, is sinking two shafts and investing heavily in a new mine in neighboring Jefferson County.

There was general disappointment when it became known that the union side would not be presented. State Senator William J. Sneed, president of the Herrin subdistrict of the United Mine Workers and reported to be a contender for the presidency of the Illinois district of the union in the December elections, had been scheduled to give the miners' side.

In a letter to County Judge Morgan, who had charge of the conference, Mr. Sneed explained his absence as a protest against discussion of wage matters. He said it was his understanding that the conference would seek a remedy for the freight-rate problem as affecting west Kentucky and southern Illinois and that the conferees would unite to ask the Interstate Commerce Commission to eliminate the additional rate contemplated by them for southern Illinois coal.

Union officialdom attributes the present depression to the freight rate on coal and it has enlisted the Illinois Commerce Commission in the fight for a reduction in the rate. John L. Lewis and the officers of the Illinois district have reaffirmed their unwillingness to consider any reduction in the wage scale and Senator Sneed took his stand with them.

William Daech, president of the Taylorville subdistrict of the union, who came to the conference but did not participate, said that the union would never accept a cut in wages.

"We know it means unemployment for many miners, but if we took a cut the non-union operators would simply reduce their scale still further and Illinois would once more be idle. We'd rather starve on a high wage scale with irregular work than starve on a lower wage with more work."

Railroad Men Tell of Work

Conrad Spens, vice-president of the Chicago, Burlington & Quincy R.R., and B. J. Rowe, traffic manager of the Illinois Central, described the efforts of their companies to serve the Illinois coal fields, but asserted that competition from non-union coal fields was due to lower cost of production at the mine rather than to freight rates, which they said could not be lowered with justice.

Meantime 35,000 miners are without any work and the other 55,000 miners do not work more than half of the time and twenty-six mines have been abandoned and 112 closed indefinitely.

20,000 Belgian Coal Miners Strike Against Wage Cut

Twenty thousand of the 36,000 Belgian coal miners in the Mons basin went on strike Aug. 14, declining to accept a wage reduction of 10 per cent. As a consequence a crisis threatens the nation's coal industry. The operators fear they cannot compete with German coal, of which 442,000 tons was imported last month. The fall in the pound sterling also favors British coal. The Belgian coal stocks are large and the operators declare the wage reduction is inevitable.

The Navy Department has called for bids on 8,000 tons of run-of-mine coal for delivery at South Brooklyn. The bids are to be opened Aug. 29.

Problems In Underground Management

This Rock-Dust Barrier Fits Odd Places

No Need for a Cabinet Maker to Make a Trough That Will Dump Dust on the Pioneering Explosion and Will Dump Again When the More Violent Blast Comes

THE JOB of making rock-dust barriers has seemed a delicate and rule-bound task to many coal-mining men. They have figured that troughs had to conform exactly to certain specifications and that the attachments were difficult to design. Not so at Rock Springs No. 4 mine, of the Union Pacific Coal Co. There they are making and installing the "Daniels Dust Barrier" easily and without purchasing anything. Elijah Daniels, assistant foreman, worked out the idea, with the aid of a few boards, a two-by-four and a couple of rods threaded at one end.

Simplicity and Adaptability

This trough is made of two 8-in. light planks nailed together in the customary V-shape with triangular end pieces. The whole is then mounted on the broad side of a two by four, the ends of which extend out 8 or 10 in. These ends are split down so as to be of triangular cross section with a flat base. This base rests in a stirrup which is made of a piece of ½-in. rod bent into a 3 x 4-in. loop at one end and threaded at the other end so that it can be screwed into wooden plugs driven into the roof of an entry.

The 3 x 4-in. loop and the shape of the end of the trough base permits the trough to turn through 45 deg. This is calculated to dump only a part of the rock-dust contents so that the balance will be ready to be thrown into suspension by the recoil shock which almost always follows an explosion.

The superiority of this trough over some types is that it is supported strongly by the two-by-four which runs its full length. This prevents sagging of the trough under the weight of the dust within it, and thus helps to maintain its sensitiveness of balance and quick response to shock. The width of the trough at its top distributes the weight of the load so that it is easily tipped over as it rests on its 4-in. base in the two stirrups at the ends.

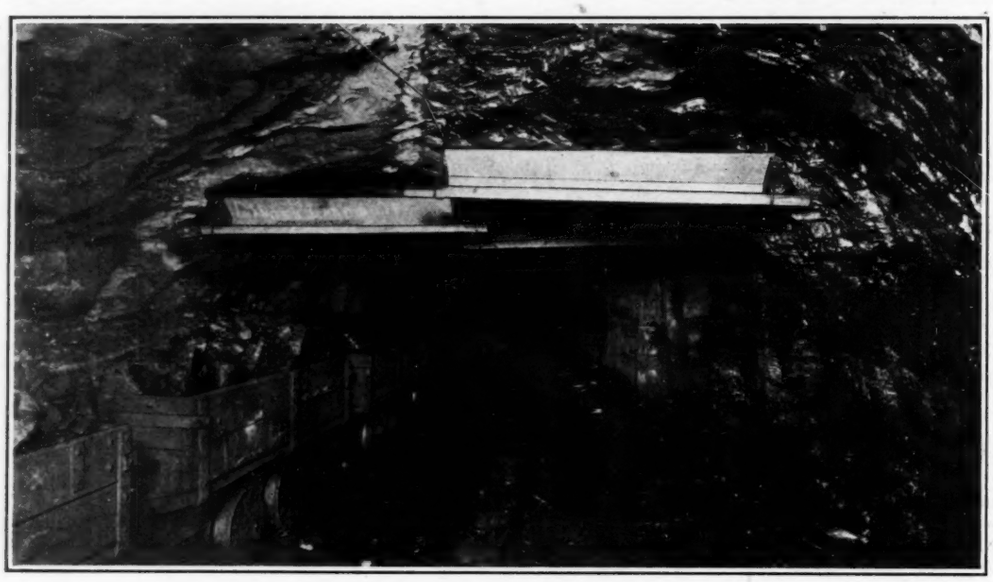
Barriers of any number of troughs can be built with this device and the troughs may be of varying length so that the barrier can be fitted into almost any shape of entry. They need not all be hung in the same horizontal plane, thus eliminating the roof brushing which is ordinarily necessary to make the roof conform to the level of the barrier. Of course some brushing is necessary where entry head room is insufficient but for no other reason.

In the installations already made in Rock Springs No. 4 mine, the troughs are all about 6 ft. long and arranged in staggered order so that, as viewed from either end of the barrier, the full width of the entry is covered. Mr. Daniels emphasizes the ease with which these troughs can be made and installed. There are no patents on any features of it and no specially designed materials are necessary.

Elaborate dust-tripping devices look well on paper but in the mine they are apt to warp and get out of shape, in which case they may dump prematurely or may not dump when needed. These troughs fit themselves to the mine. They may not look prepossessing to the visitor but they should effectively smother out an explosion.

Model Installation

Elijah Daniels, assistant foreman of No. 4 mine of the Union Pacific Coal Co., Rock Springs, Wyo. who devised this new barrier, showing a few troughs hung on 4x4-in. beams.



Daniel Dust Barrier

The wooden troughs can be built of any length, but these are 6 ft. long. The staggered arrangement in this installation of the Union Pacific No. 4 mine, Rock Springs, Wyo., permits the full width of the haulageway to be covered. They need not all be hung in the same horizontal plane, so little roof brushing is necessary to make room for them.

How to Support a Roof, Thus Increasing Extraction and Avoiding Squeezes

A Big Pillar Is Left, Two Rooms Wide, at Six-Room Intervals—Rooms Are Sealed and Big Pillar Extracted From Two Directions

By Charlton Dixon
Superintendent, Le Noir Coal Co.,
Indianapolis, Ind.

Many mines in Indiana have had much difficulty and suffered no small loss by reason of squeezes, that develop because the entry and room pillars are inadequate. They come suddenly, burying rails, cars, mining machines and other equipment beneath them. Apparently no method can be devised that will prevent them entirely. A modification of the usual method of room placement, however, as will be shown, may do much to render operation safer and to save coal that would otherwise be crushed and lost.

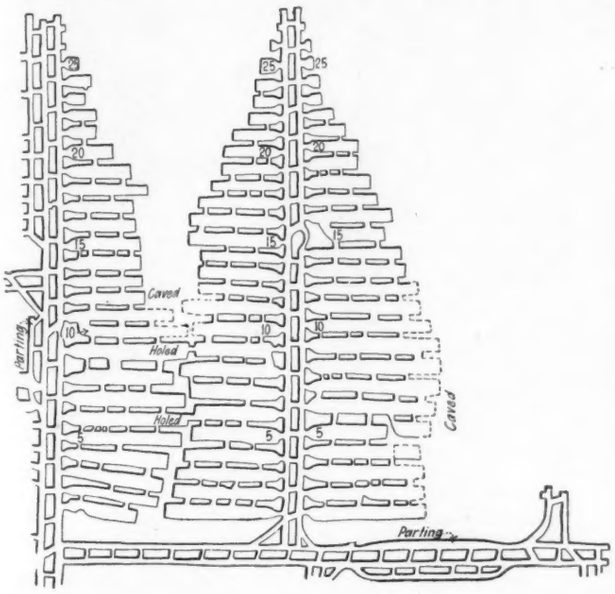
About two years ago I took charge of an operation where scarcely a pair of butt entries reached their projected length although none of the room ribs were slabbed. In this region the miners' union insists that tracks be laid in the center of the room. This practice is responsible for the loss of about 30 per cent of the coal in the bed. Under ordinary conditions an extraction of approximately 55 to 60 per cent of the coal is attained. The usual arrangement of rooms is shown in Fig. 1.

In order to prevent the development of squeezes I adopted the extremely simple but efficient method of room placement shown in Fig. 2. Beginning, say, at the lower left-hand corner of the figure, six rooms are successively turned from the entry. Next the distance occupied by two rooms and their rib pillars is left blank. When room No. 6 has been driven 45 ft. (the legal distance) the first crosscut is started. From this, rooms Nos. 7 and 8 are turned, the first from the No. 6 and the second from the No. 9 ends. Both rooms are started full width. This provides a protecting block of coal 45x75 ft. in plan.

On the parallel entry the room arrangement is the same except that the blocks are staggered. This places the strongest roof support of one entry opposite the weakest part of the roof on the next. The cost is not increased and the coal left in place is in such position that it can be recovered easily.

More coal is now being extracted from the rooms by this method than ever before. This is accomplished by thinning down the room or rib pillars to such an extent that they will support the roof adequately, yet offer but little resistance to a general cave. The depth of the bed is from 125 to 150 ft. With heavier cover the two short rooms could be left in the solid as a protection to the entries. When these latter passages have been holed through to a new panel the blocks of coal thus left standing could be attacked near the middle of the panel just completed, part of the coal being taken out one way and part the other. This would provide a rapid extraction.

At the depth mentioned, however, the method above outlined has proved to be both simple and safe, affording ample protection to the entries. The old layout, because of a slight but continuous settlement of the tender roof after a few rooms had been worked out and weight had begun to act on the weak pillars, was extremely dangerous, and roof falls were of daily occurrence. By the new method all this has been eliminated. Freedom from both roof falls and squeezes is now enjoyed even during strikes or long periods of shut down.

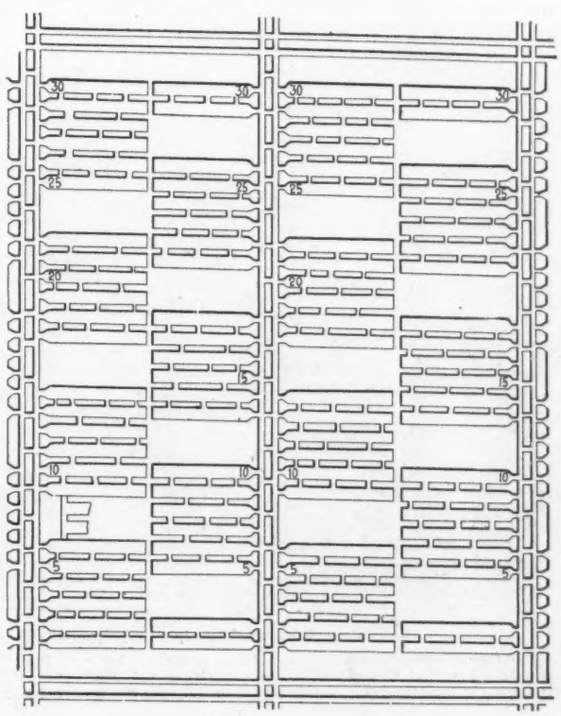


Former Working Method

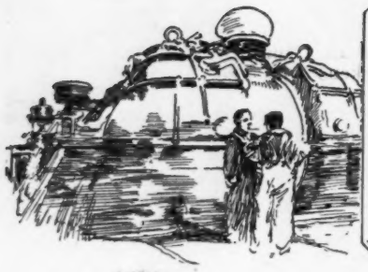
Every little while the roof would start to move, crushing down the pillars, heaving the bottom and burying rails, cars and mining machines, and making much good coal inaccessible. Such coal even where approached from another direction is difficult to extract being laden by the weight of unsettled roof adjacent to it.

Two Rooms Omitted

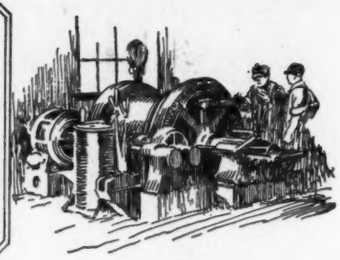
These two-room spaces serve as barrier pillars. They prevent squeezes from occurring, and most of the coal in them can be recovered. With this method the pillars can be slabbed. For these reasons the recovery percentage is high. It will be noted that pillars are staggered thus strengthening adjacent ill-supported areas. Illinois and Indiana have both had much trouble from uncontrolled roof despite the low extractions usually attempted.



BRASS GAUZES FOR FLAME SAFETY LAMPS—In most flame safety lamps the gauze has been of iron or steel, states Bulletin 227, recently issued by the Bureau of Mines. Some brass gauzes have been adopted, and a few lamps have been provided with copper gauzes. The laws of several states require that a certain number of lamps must be kept on hand at each mine for emergencies. Lamps used in this kind of service should have a non-corrosive type of gauze as a necessary safeguard. Before bonneted lamps became so widely adopted, iron and steel gauzes had advantages over those of brass. To-day, however, it might be more economical to use a good brass gauze for bonneted lamps used in general service.



Practical Pointers For Electrical And Mechanical Men



Present Mine Shop Equipment Used For Factory Repair Work

New Mining Machinery Requires Special Apparatus for Making Repairs—Large Lathe Adapted to Do Horizontal Boring—Pump and Motor-Frame Parts Renewed at Low Costs

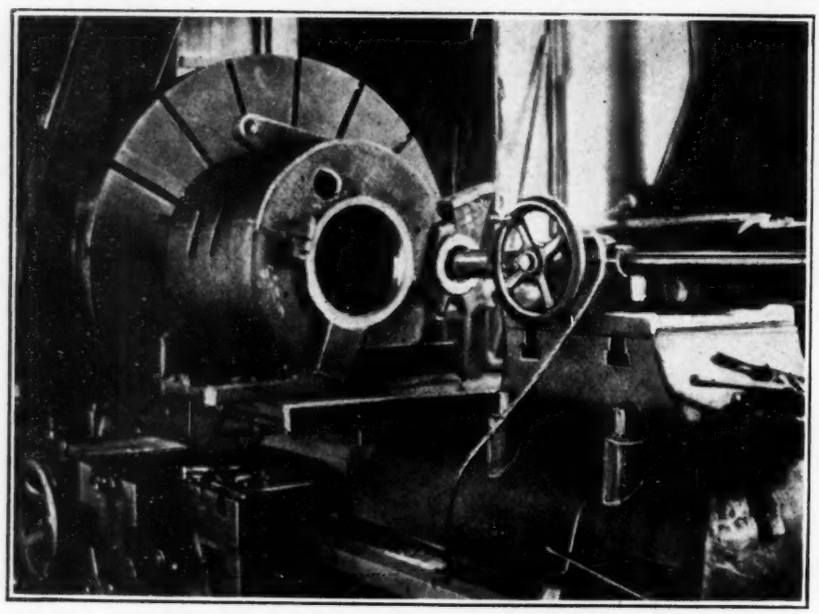
SOME coal companies are favorably located near large towns to which they can send their electrical and mechanical equipment to be repaired; others are not so fortunate and therefore must depend upon their own resources when emergencies arise or whenever some special work must be done. In any event certain repair equipment is always necessary at a mine and, of course, the more machinery in the repair shop, the more independent the mine becomes.

Boring machines are nearly always considered an important part of the equipment of a mine repair shop. However, there are few shops equipped with large boring machines. For years there has not been much demand for large machines of this kind among the coal mines but, since the centrifugal pump has been extensively used, mining men have often had occasion to use such a unit to repair centrifugal-pump casings.

Usually a pump casing or mine-locomotive frame is scrapped as soon as it has worn to such an extent that the parts no longer fit properly. To avoid such losses and obviate the delays occasioned by placing orders for new parts and awaiting deliveries, the Pennsylvania Coal & Coke Co. found that a large boring machine would soon pay for itself. However, before purchasing the unit the workmen looked around for another way to repair their worn pump and motor parts.

In the repair shop of the company located at Gallitzin, a large lathe has been installed for machining heavy pieces of equipment. Locomotive wheels and pump parts are often machined in this lathe.

Turning to the big lathe the workmen soon converted it into a horizontal boring machine. When repairs are to be made to a centrifugal-pump casing or a locomotive motor frame it is set on the lathe and tools mounted on a shaft driven from the face plate do the cutting, the casing or frame being moved to the tool on a traveling carriage specially designed for this work.



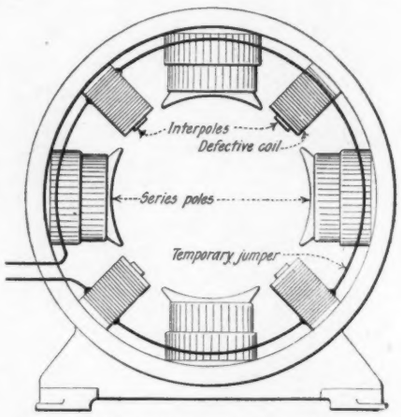
How Repairs Are Made to a Locomotive Motor Frame

After the worn parts have been built up by welding, the motor frame is accurately mounted on a traveling carriage. The cutting tool is fastened to a revolving shaft driven by the lathe. Inside cuts are made by moving the motor frame to the revolving tool.

Series Motor with Shorted Interpole Kept in Service

Sometimes an interpole in a direct-current motor burns out or is grounded, thus putting the motor and the equipment it drives out of service until the winding has been replaced or repaired.

In a case of this kind it is possible to operate series motors, especially on locomotives, by simply connecting a strap or jumper across the defective or removed pole to the remaining adjacent poles, which are still in good condition. No change will be made to the polarity of the remaining poles, it being necessary only to take the defective pole out of service. The above method will lead the current across the removed pole and will cause a slight sparking on the commutator, but it will not prove serious to the operation of the motor under light loads. Motors in this condition should not be run under overload. Of course the defective field should be repaired and placed in position as soon as possible.



Cutting Out an Interpole

By placing a jumper to carry the current around a defective interpole field coil, a motor may be kept in service the remainder of a working day.

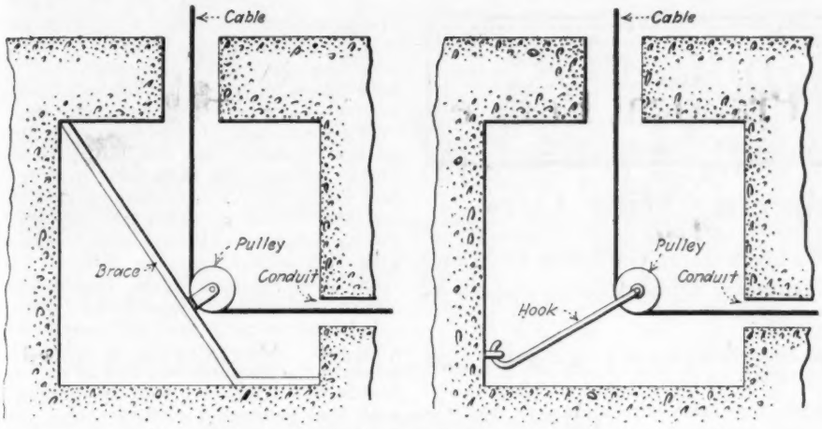
R. J. HERMANN.

Terre Haute, Ind.

Pulling Cables into Manholes

Several clever arrangements for pulling electric cables are shown in the accompanying illustrations. One of these sketches shows how special shoring of a heavy beam holding a pulley may be installed. The othel illustration shows how a hook may be used. It is obvious that the hook and arm should be long enough so that the pulley will line up somewhere near the center of the conduit.

The necessary pulling power at the



Ways to Pull Cables Through Conduits

Special shoring inside the hole or an iron hook with a pulley may easily be arranged to take the strain of the pulling rope.

mine may easily be obtained from a hoist or locomotive. Special gasoline engines or storage-battery driven devices are also available for this purpose where the hoist must be portable or used without tracks.

Unique Steel Structure

This tower at Donk Bros. mine, Edwardsville, Ill., serves as a guide for the hoisting ropes and an unloading structure. It is fitted with a large crane.

Rotary Breaks Down Due to Imperfect Foundation

Some few days ago one of the rotary converters operated by our company was reported to be sparking slightly. The attendant noticed that this sparking had gradually increased in severity during a period of about a month.

During heavy loads the brushes on the alternating-current end of the armature threw off fine white sparks, but when the load was low the fire from the rings and brushes practically stopped. After resetting the brushes and polishing the rings the conditions improved but little. The cause of this trouble was a mystery to the attendant.

The other day the armature in this machine burned up. Undoubtedly the sparking at the brushes was a premonitory sign of this accident. Inspection of the damaged machine disclosed no further clew and a spare armature was installed. As soon as the machine was started it vibrated severely; further investigation revealed the fact that the foundation was loose from the floor of the building.

The cause of the accident no doubt was the vibration of the machine and foundation. Years ago when the rotary was new and the foundation was solid to the floor of the station there was little vibration, but, as years have gone by, parts of the machine are now slightly out of balance and the foundation has proved to be too small.

Little warnings like that given by the sparks at the brushes usually presage trouble, but the cause frequently is ascertained too late.

GEO. MYRICK, JR.

Tarnish-Resisting Coat for Polished Metal Surfaces

About coal-mine offices, power plants, substations and similar places are frequently many metal surfaces that for the sake of appearance should be kept bright and clean. "Polishing, the bright work" of engines, turbines, boilers and the like is a never-ending job and one that is the bane of the engine tender's existence.

One method of partially avoiding this difficulty consists of polishing the surface that it is desired to keep bright, thoroughly removing all traces of the polishing compound, and then lacquering. Lacquer, however, frequently dulls the luster or bright appearance of the surface upon which it is placed. This is probably due to the fact that to a certain extent it darkens with age.

Another protective coating that may be applied to polished metal surfaces is one of collodion. This dries quickly and is practically transparent. For best results two coats should be applied.

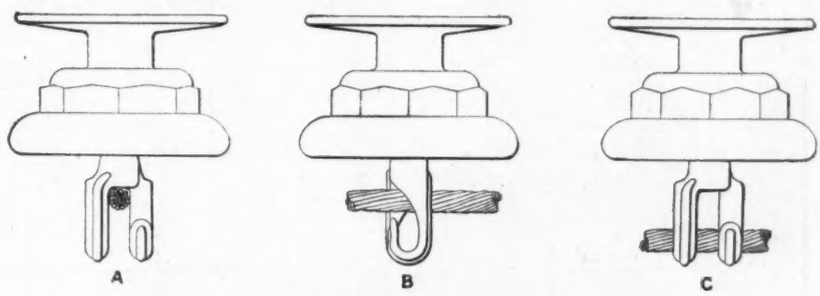
Holding Feeder Wire from Mine Hanger

Many types of insulators and insulator supports are used in the mines; some are good and some are bad. One of the best types of insulators is the trolley hanger. This device performs its functions under most unfavorable conditions. Often it is mounted on a loose board or a wet roof where the vibration of the trolley wire and the pounding of the trolley wheels combine to cause rust or failure.

In a section of one of our mines, the electrician had been having much trouble with the continued tearing down of the feeder wires, mounted on the side of the gangway. These feeders had been rehung and repaired until most of them were almost bare. This condition made the haulway dangerous, but had new feeders been provided the difficulty would not have been met, for they soon would have been in as bad condition as the old ones. It so happened that an old trolley wire on the side of the road was also used as a feeder. This wire was small and therefore insufficient in itself to carry the total load.

Continual trouble with the feeders on the side of the haulway prompted the electrician to make a change. Looking around he came to the conclusion that the feeders would be much safer and freer form damage if mounted on the roof. The old trolley wire, just mentioned, was mounted on the usual type of mine hangers and after removing the wire and trolley ears the electrician fastened some sister hooks to the hangers as shown in the illustrations. After this was done a heavy feeder was hung on the hooks as shown. The results were unusually satisfactory because no new insulators had to be installed.

As shown in the illustration the hook is turned so that the wire enters between the two prongs. When this is done the hook is turned 90 deg. and the wire dropped into position. The wire is thus locked in place and side strain in any direction cannot pull it out of the hook.



Use of Mine Hanger to Hold Feeder Wire

A, shows an end view with the cable raised in position between the two prongs. *B*, illustrates a side view of the hook and wire. *C*, shows the sister hook turned and the wire dropped into position where it is held by the two prongs.

Discussion

Saving Time in Gathering Mine Cars

Description of Work of Reel-and-Trolley Locomotive Gathering to Main-Line Locomotive, with Switches for Loads in Inbye Crosscut

By Alexander Bennett
Edwardsville, Ill.

The plan, submitted by Mr. Shacikoski for speeding haulage, in the Aug. 7 issue of *Coal Age*, page 196, is certainly an improvement over the first one mentioned by him, and which he justly criticises as inadequate. Even his remedial method, however, leaves much to be desired, especially where a large tonnage is in prospect. He does not indicate the tonnage obtainable by his revised mine layout and whether it is applicable to a mine that is subject to the generation of dangerous quantities of methane.

My experience has laid wholly in the production of coal where gas is emitted in sufficient quantities to command a wholesome respect. However practicable either of the plans mentioned by Mr. Shacikoski may be in a non-gaseous operation, I am satisfied that neither would be tolerated in any well-regulated gaseous coal mine. This would be particularly true if gas is generated in dangerous quantity, and each panel is sealed off by double concrete walls as soon as the coal is extracted.

I have in mind a mine in which coal is being gathered from the faces, without serious loss of time to either loader or operator. A three-ton car is being used on grades so steep that it is considered to make the use of mules inadvisable, but over which a five-ton reel-and-trolley locomotive can be utilized successfully.

One such locomotive can supply cars to the loaders working after two cutting machines. This, with fourteen men to each machine, would give an average daily output of 150 tons. The conditions are favorable, with from 6 to 6½ ft. of coal after leaving one foot of top coal in place to protect the roof. The panel system of mining has been adopted.

The accompanying sketch illustrates the method of gathering the coal. Briefly, it is as follows: The haulage locomotive leaves fourteen empty cars on the parting, taking an equal number of loads to the bottom. The gathering motor takes the fourteen empties to the point *A*, where half of the trip is uncoupled and left. With the other half the gathering machine proceeds to the 1st North and, pushes the cars ahead of it, one empty being dropped into the neck of each room where loaders are working. This is all done in one operation.

The last empty is pushed into the last room to the switch nearest the face. Here the motor couples onto the load and takes it to the entry and up to the next room switch where it is uncoupled. The locomotive then pushes the next empty into the room, up to the switch nearest the face, brings out another load, couples onto the one on the entry, and continues the operation until all seven loads are picked up. These are then pulled out to the point *B*, at the main-line switch, and left there.

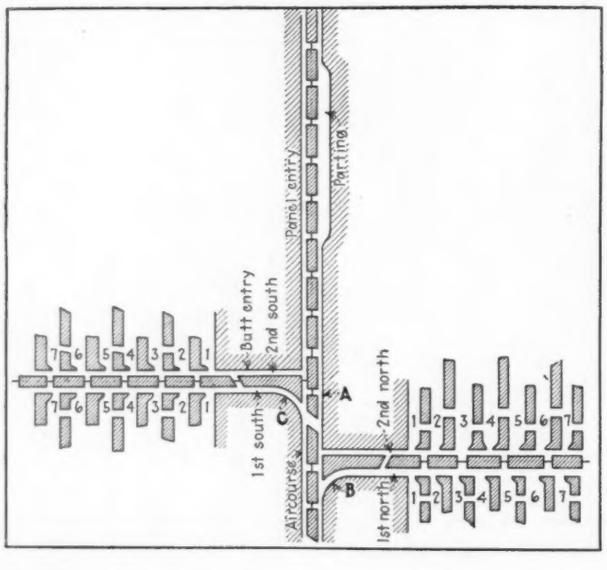
Running light the locomotive then goes to the point *A*, picks up the other seven empties, backs them into the 1st South, and repeats the same sequence of operations as in the 1st North but this time leaving the loads at point *C*. The haulage motor can then pick up both these short trips after its own empties have been thrown in the clear.

With a favorable grade, however, the gathering motor can put all the loads on the parting and save time in switching later on. Each room should be equipped with a latch switch, with heavy latches. The trip-rider should kick this switch open as soon as the loads pass out over it, in those rooms, where loaders are working.

It is necessary to work only one north, and one south entry at a time. In level workings, however, two other machines can operate inside the parting, and the haulage locomotive can pull twenty-eight empties instead of only half this number.

Every successful operation presupposes that those employed shall be "live wires." The plan above outlined is no exception to this rule. The trip-rider and motorman must have average intelligence, and to a reasonable degree must possess the ability to co-operate. They must be predisposed to get maximum results. Where cars are plentiful, doubleheader trips will give still more gratifying results than are attainable by the plan just outlined.

Transportation is today a vital problem in successful coal mining. The sporting instinct, if possible, should be aroused in everyone responsible for the movement of coal toward the shaft bottom. Turn-boards should be placed on each parting where two or more drivers or motormen leave their trips. These should be kept by the trapper or parting tender. Tact and commonsense will do the rest.



Haulage Layout

By gathering with a locomotive specially engaged in that service delays are avoided and loaders are kept busy, all this without spoiling the ventilation by excessive interconnection. The use of switches in the last crosscut of each room involves some labor and reduces, in a degree, the efficiency of the arrangements. At this particular mine cars have to be delivered to the working face.

Not Protecting the Fan Duly

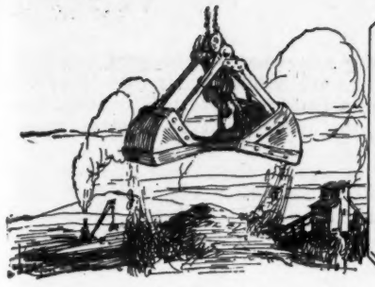
In some recent explosions to which reference has been made in *Coal Age* the fan has been put out of commission, thus delaying rescue work. This makes me wonder whether the practice of placing a relief section on the fan way at the surface is in common use. The fan should be at least 50 ft. from the tunnel and the airway leading to it should be of concrete with a concrete roof, but on the way should be a slight turn if the entrance is by a slope or drift, and the outer angle should embody a wood frame made of light dressed lumber that could be made air-tight by placing red lead at the joints. A good coating of paint would preserve the wood.

As the frame is at the outer side at the angle the force of an explosion would be directed at it and the fan saved. In the case of a shaft almost a right angle is made in the airway between the fan and the airshaft, and in this case the wooden framework can be put immediately over the top of the shaft. This opportunity for relieving the pressure could not fail to assist greatly in preventing injury to the fan.

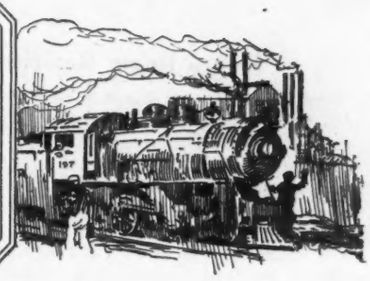
The frame could be readily repaired and the ventilation restored in a few minutes after the arrival of help, especially if the right materials were left on the ground and in proper condition for their replacement.

James Gray.

Newcastle, Wash.



Production And the Market



Bituminous-Coal Business Begins to Show Signs of General Improvement; Price Gain Holds

Signs of improvement in the bituminous-coal trade are beginning to appear in most of the market centers of the country, apparently reflecting the beginning of the long looked-for beginning of a fall revival in business. This is the most encouraging development in the industry since the recent prolonged depression set in, the betterment being so much broader in character than the previous fitful flurries as to be indicative of lasting qualities. New England, however, continues to be an exception to the tendency toward betterment. Officials of the Pennsylvania R.R. have issued "shop early" advice to coal consumers desiring to be prepared for the cold weather, warning them that shipments are below normal for this time and that consequently there is a likelihood of a car shortage, with the usual attendant evils, unless there be an increase in movement soon. The New York Commissioner of Markets has expressed himself in a similar vein.

Dawes Plan Holds Hope for Export Trade

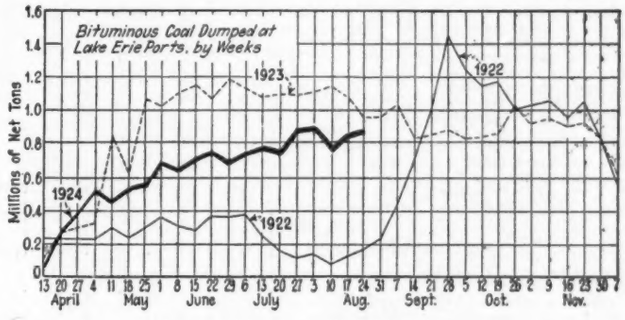
A revival in world trade is forecast by the U. S. Department of Commerce as a result of the adoption by the London conference of the Dawes report, which is hailed as "the greatest effort since the war to bring about economic reorganization in Europe," forecasting a stimulation in exports of American raw materials and the eventual restoration of world markets upon which American producers depend. All of which has an interesting bearing upon the much talked-of plan to build up America's export coal trade.

Coal Age Index of spot prices of bituminous coal continued to maintain the slight advance reported last week, standing on Aug. 25 at 165, the corresponding price being $2, the same as for the preceding week.

Activities at Hampton Roads showed a pronounced falling off during the week ended Aug. 21, dumpings of coal for all accounts totaling 315,540 net tons, a decrease of 80,028 tons from the previous week.

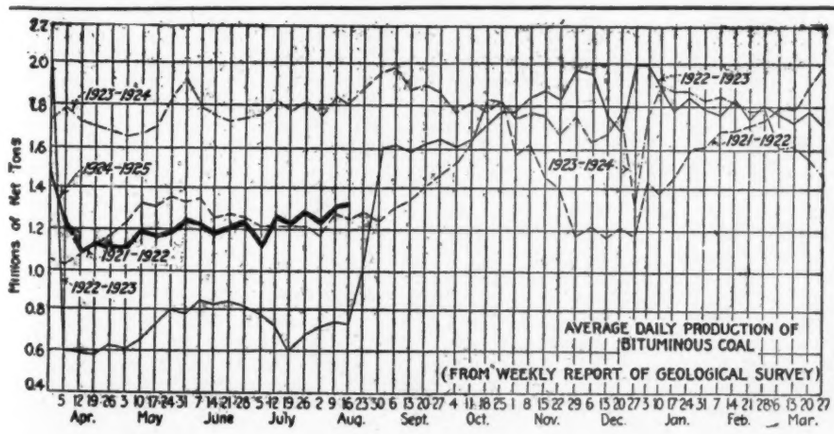
A further upturn marked the movement of coal at the lakes, dumpings during the week ended Aug. 24, according to the Ore & Coal Exchange, being as follows: For cargo, 804,133 net tons; for fuel, 42,021 net tons. This compares with 765,872 and 42,785 net tons respectively for the week before.

Production of bituminous coal again increased slightly during the week ended Aug. 16, the output, according to the Geological Survey, totaling 7,831,000 net tons. This compares with an output of 7,789,000 net tons during the week ended Aug. 9, according to revised figures. Anthracite production, however,



showed a marked falling off, 1,386,000 net tons having been produced during the week ended Aug. 16, compared with 1,664,000 net tons during the preceding week.

Anthracite also showed slight indications of an early upturn, though tangible evidence in the shape of actual orders is still rather meager. Stove coal continues to be the size most in demand, activity being largely confined to independent coals, which for the most part are quoted below company schedule. The larger companies are still working on a schedule of four days a week, but they all expect to be working full time during September.



Estimates of Production

(Net Tons)

	1923	1924
BITUMINOUS		
Aug. 2	10,564,000	7,484,000
Aug. 9 (*a*)	9,851,000	7,789,000
Aug. 16 (*b*)	10,843,000	7,831,000
Daily average	1,807,000	1,305,000
Cal. yr. to date (*c*)	343,229,000	277,504,000
Daily av. to date	1,776,000	1,431,000
ANTHRACITE		
Aug. 2	2,018,000	1,720,000
Aug. 9	1,735,000	1,664,000
Aug. 16	1,858,000	1,386,000
Cal. yr. to date (*c*)	64,417,000	57,239,000
COKE		
Aug. 9 (*a*)	326,000	89,000
Aug. 16 (*b*)	334,000	94,000
Cal. yr. to date (*c*)	12,473,000	6,763,000

(*a*) Revised since last report. (*b*) Subject to revision. (*c*) Minus one day's production to equalize number of days in the two years.

Hopes Being Realized in Midwest

The Chicago coal market is beginning to reflect signs of returning industrial activity and prosperity. The country trade in Iowa, Illinois, Minnesota and the two Dakotas is showing signs of renewed activity and it is expected that their inquiries and orders will increase daily from now on. Smokeless coals in the prepared sizes showed a very slight decrease this week, but eastern Kentucky block coal shows very material signs of strengthening. The market on steam coals is in fair shape. The demand has increased a little but the supply remains just about the same as it was about a week ago. There has been a little strengthening in prices on high-grade screenings in southern Illinois. Operators who have coal loaded on track and can furnish car numbers to the big industrials in Chicago are having no difficulty whatever in disposing of their coal.

Autumn Buying Movement in Kentucky

Sentiment in Louisville is better, indicating better working time at the mines, freer movement of coal and that many mines that have been operating only half time or less are now running fairly close to full time. There has been a notable improvement in demand for prepared sizes, while prices are stiffening somewhat on prepared, especially block sizes, and screenings are holding their own in eastern Kentucky and increasing a little in western Kentucky, there being good demand in the latter field and better mining conditions.

In eastern Kentucky it is said that there is little block coal to be had at under $2.40 to the trade, and more operators are asking as high as $2.75 for top grades. It appears as if the long-awaited fall demand is at hand and that business will be fairly active over the next several months.

The western Kentucky market has been firmer over the past two weeks, but prices may drop soon if the operators resume operations on a non-union basis at the 1917 scale, as it is also asserted that miners will be paid on a production basis of prepared that will run over a 1¼-in. screen, in an effort to force miners to quit blowing coal to dust by overshooting it.

Northwest Markets Getting Stronger

The Duluth market is stronger with slight increases in prices. Anthracite remains the same as last reported, but the demand is increasing, as the last regular 10c. monthly advance goes into effect Sept. 1. Forty cargoes arrived

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Aug. 27 1923	Aug. 11 1924	Aug. 18 1924	Aug. 25 1924†
Smokeless lump	Columbus	$5.85	$3.60	$3.60	$3.50@$3.75
Smokeless mine run	Columbus	3.00	2.10	2.00	1.85@ 2.15
Smokeless screenings	Columbus	2.35	1.20	1.20	**1.15@ 1.35**
Smokeless lump	Chicago	6.35	3.85	3.85	*3.50@ 3.75*
Smokeless mine run	Chicago	3.35	1.85	1.85	1.75@ 2.00
Smokeless lump	Cincinnati	6.10	3.85	3.85	*3.50@ 4.00*
Smokeless mine run	Cincinnati	3.25	1.85	1.85	1.75@ 2.00
Smokeless screenings	Cincinnati	2.75	1.30	1.35	*1.25@ 1.50*
*Smokeless mine run	Boston	5.05	4.20	4.15	4.10@ 4.20
Clearfield mine run	Boston	2.20	1.90	1.85	1.35@ 2.35
Cambria mine run	Boston	2.85	2.25	2.45	2.00@ 2.90
Somerset mine run	Boston	2.50	2.05	2.10	1.75@ 2.50
Pool 1 (Navy Standard)	New York	3.25	2.30	2.30	**2.50@ 3.25**
Pool 1 (Navy Standard)	Philadelphia	3.10	2.80	2.80	*2.35@ 2.50*
Pool 1 (Navy Standard)	Baltimore				
Pool 9 (Super. Low Vol.)	New York	2.50	2.05	2.05	**2.00@ 2.25**
Pool 9 (Super. Low Vol.)	Philadelphia	2.55	2.15	2.15	1.95@ 2.35
Pool 9 (Super. Low Vol.)	Baltimore	2.50	1.95	1.95	1.90@ 2.00
Pool 10 (H.Gr. Low Vol.)	New York	2.25	1.95	1.85	1.70@ 2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia	2.15	1.75	1.75	1.65@ 1.90
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.25	1.70	1.70	1.65@ 1.75
Pool 11 (Low Vol.)	New York	2.00	1.60	1.60	1.50@ 1.75
Pool 11 (Low Vol.)	Philadelphia	1.80	1.45	1.45	1.35@ 1.60
Pool 11 (Low Vol.)	Baltimore	1.90	1.55	1.55	1.50@ 1.60
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.75	1.50	1.50	1.35@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia	1.80	1.50	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.)	Baltimore	1.85	1.45	1.45	1.40@ 1.50
Pittsburgh sc'd gas	Pittsburgh	2.90	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh	2.45	2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	2.20	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	1.55	1.30	1.30	*1.25@ 1.35*
Kanawha lump	Columbus	3.05	2.10	2.10	2.00@ 2.25
Kanawha mine run	Columbus	1.85	1.40	1.40	1.30@ 1.55
Kanawha screenings	Columbus	1.05	1.05	1.05	1.00@ 1.15
W. Va. lump	Cincinnati	3.50	2.25	2.25	*1.85@ 2.25*
W. Va. gas mine run	Cincinnati	1.75	1.45	1.55	*1.40@ 1.60*
W. Va. steam mine run	Cincinnati	1.75	1.45	1.40	**1.40@ 1.60**
W. Va. screenings	Cincinnati	1.20	.85	.90	**.90@ 1.10**
Hocking lump	Columbus	2.75	2.45	2.45	*2.25@ 2.55*
Hocking mine run	Columbus	1.85	1.55	1.55	1.45@ 1.65
Hocking screenings	Columbus	1.10	1.05	1.05	1.00@ 1.15
Pitts. No. 8 lump	Cleveland	2.65	2.40	2.40	2.00@ 2.85
Pitts. No. 8 mine run	Cleveland	2.10	1.85	1.85	*1.75@ 1.85*
Pitts. No. 8 screenings	Cleveland	1.35	1.20	1.30	*1.15@ 1.30*

Midwest	Market Quoted	Aug. 27 1923	Aug. 11 1924	Aug. 18 1924	Aug. 25 1924†
Franklin, Ill. lump	Chicago	$4.20	$2.85	$2.85	$2.75@$3.00
Franklin, Ill. mine run	Chicago	3.00	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago	1.65	1.70	1.85	**1.75@ 2.00**
Central, Ill. lump	Chicago	2.60	2.50	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	2.20	2.10	2.10	**2.15@ 2.25**
Central, Ill. screenings	Chicago	1.40	1.60	1.60	*1.35@ 1.75*
Ind. 4th Vein lump	Chicago	3.35	2.60	2.75	**2.75@ 3.00**
Ind. 4th Vein mine run	Chicago	2.60	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago	1.55	1.70	1.80	1.75@ 1.85
Ind. 5th Vein lump	Chicago	2.75	2.35	2.50	**2.40@ 2.65**
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.40	1.55	1.50	1.40@ 1.65
Mt. Olive lump	St. Louis	3.00	2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis	2.00	2.50	2.50	2.50
Mt. Olive screenings	St. Louis	1.50	2.00	2.00	2.00
Standard lump	St. Louis	2.50	2.15	2.15	2.00@ 2.35
Standard mine run	St. Louis	1.85	1.80	1.80	1.75@ 1.85
Standard screenings	St. Louis	1.00	1.20	1.20	1.15@ 1.25
West Ky. lump	Louisville	2.40	2.10	2.20	**2.15@ 2.35**
West Ky. mine run	Louisville	2.10	1.60	1.60	1.40@ 1.85
West Ky. screenings	Louisville	1.05	1.15	1.20	**1.25@ 1.35**
West Ky. lump	Chicago	2.75	2.05	2.30	2.15@ 2.45
West Ky. mine run	Chicago	1.60	1.60	1.55	**1.35@ 1.90**
South and Southwest					
Big Seam lump	Birmingham	3.50	3.40	3.40	3.30@ 3.50
Big Seam mine run	Birmingham	1.95	1.75	1.75	1.50@ 2.00
Big Seam (washed)	Birmingham	2.35	2.00	2.00	1.75@ 2.25
S. E. Ky. lump	Chicago	3.10	2.10	2.50	**2.50@ 2.75**
S. E. Ky. mine run	Chicago	1.80	1.50	1.60	**1.50@ 2.00**
S. E. Ky. lump	Louisville	3.00	2.10	2.10	2.00@ 2.25
S. E. Ky. mine run	Louisville	1.85	1.55	1.50	1.25@ 1.75
S. E. Ky. screenings	Louisville	1.10	.95	.95	.85@ 1.10
S. E. Ky. lump	Cincinnati	3.25	2.35	2.35	**2.25@ 2.75**
S. E. Ky. mine run	Cincinnati	1.70	1.45	1.55	*1.45@ 1.65*
S. E. Ky. screenings	Cincinnati	1.15	.95	1.00	**.90@ 1.15**
Kansas lump	Kansas City	4.50	4.50	4.50	4.50
Kansas mine run	Kansas City	3.50	3.50	3.50	3.50
Kansas screenings	Kansas City	2.60	2.50	2.50	2.50

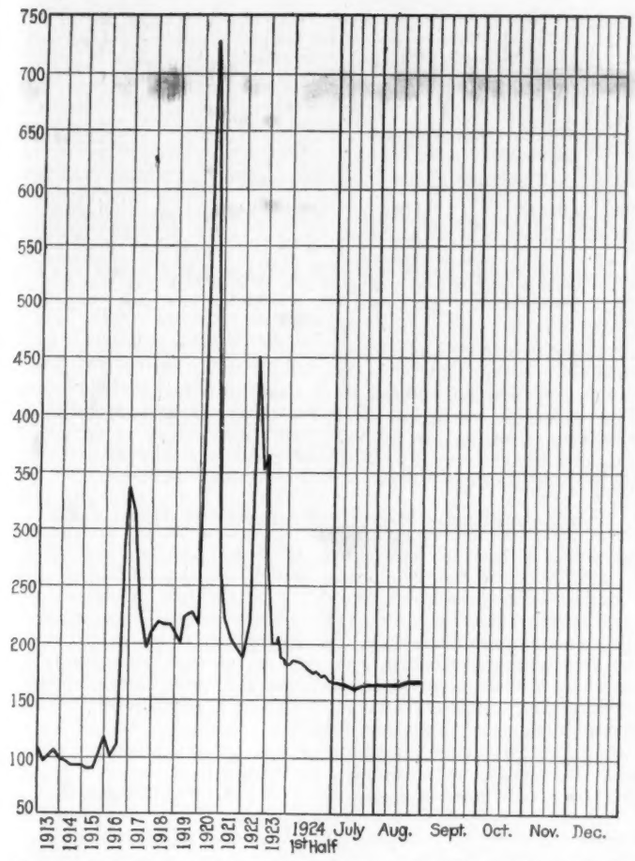
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Aug. 27, 1923 Independent	Aug. 27, 1923 Company	Aug. 18, 1924 Independent	Aug. 18, 1924 Company	Aug. 25, 1924† Independent	Aug. 25, 1924† Company
Broken	New York	$2.34		$7.75@$8.35		$8.00@$9.10		*$8.00@$9.05*
Broken	Philadelphia	2.39		7.90@ 8.10		8.90@ 9.05		8.90@ 9.05
Egg	New York	2.34	$8.50@$13.00	8.00@ 8.35	$8.35@$8.75	8.65@ 9.10	**$8.50@$9.00**	*8.65@ 9.05*
Egg	Philadelphia	2.39	9.25@ 11.00	8.10@ 8.35	9.00@ 9.70	9.00@ 9.05	9.00@ 9.70	9.00@ 9.05
Egg	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	8.09@ 8.20	8.03@ 8.10	8.09@ 8.20	8.03@ 8.10
Stove	New York	2.34	8.50@ 13.50	8.00@ 8.35	9.25@ 9.60	8.65@ 9.45	*9.00@ 9.50*	*8.65@ 9.30*
Stove	Philadelphia	2.39	9.25@ 11.00	8.15@ 8.35	9.35@10.00	9.05@ 9.10	9.35@10.00	9.05@ 9.10
Stove	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	8.40@ 8.50	8.43@ 8.53	8.40@ 8.50	8.43@ 8.53
Chestnut	New York	2.34	8.50@ 13.00	8.00@ 8.35	8.25@ 8.75	8.65@ 9.15	**8.50@ 9.00**	8.65@ 9.15
Chestnut	Philadelphia	2.39	9.25@ 11.00	8.15@ 8.35	8.85@ 9.80	9.00@ 9.05	8.85@ 9.80	9.00@ 9.05
Chestnut	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	8.18@ 8.33	8.28@ 8.34	8.18@ 8.33	8.28@ 8.34
Range	New York	2.34		8.30		8.90		8.90
Pea	New York	2.22	6.75 @ 8.50	6.00@ 6.30	4.25@ 5.25	5.75@ 6.00	4.25@ 5.25	*5.50@ 6.00*
Pea	Philadelphia	2.14	7.00 @ 7.50	6.15@ 6.20	5.75@ 6.25	5.75@ 6.00	5.75@ 6.25	5.75@ 6.00
Pea	Chicago*	4.79	7.00 @ 8.50	5.30@ 5.65	5.23@ 5.55	5.36@ 5.91	5.23@ 5.55	5.36@ 5.91
Buckwheat No. 1	New York	2.22	3.50	3.50@ 4.15	2.00@ 2.25	3.00@ 3.15	2.00@ 2.25	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	2.50	2.50	1.70@ 2.00	2.00@ 2.25	**1.75@ 2.00**	2.00@ 2.25
Rice	Philadelphia	2.14	2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.50	1.50	1.15@ 1.40	1.50	1.15@ 1.40	1.50
Barley	Philadelphia	2.14	1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22		1.60		1.50		**1.60**

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	Aug. 25	Aug. 18	Aug. 11	Aug. 27
Index	165	165	163	202
Weighted average price	$2.00	$2.00	$1.98	$2.44

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1924, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

last week, of which nine were hard coal, and thirteen are en route, of which three are hard coal. The railroads are giving good dispatch from the docks and unless ordering falls off considerably the docks will not get choked to any marked degree this year. The second cargo of Ford coal has arrived, being 13,000 tons on the steamer Ford 2nd. Announcement has been made that Ford will bring up 200,000 tons this year.

The requirements of the Northern States Power Co. have just been filled, and 200,000 tons of screenings came to the docks here. This was divided among the Pittsburgh Coal Co., the Peter Reiss Coal Co., the Inland Coal Co. and the Berwind Fuel Co. The price was not disclosed.

There has been some pickup in the Twin Cities of late, but it is a good month late, so that deliveries are far below normal for this time. Prices on dock coal remain at recent levels. Southern Illinois coal is on a $3 basis as before, with little moving to the Northwest as yet. Hard coal is moving to the interior and to some extent to the Twin Cities, but not as much as normal at this date. Yet the crop movement is under way and that should give a return cargo of coal for the cars which bring wheat and other grains to the terminals.

The Milwaukee market is very quiet. A change in the price of anthracite is promised for Sept. 1, when undoubtedly there will be a greater demand than for some time past. Receipts by lake are slow. Thus far this season 445,323 tons of anthracite and 1,139,655 tons of soft coal have been received. Last season up to the same time 552,680 tons of anthracite and 1,735,700 tons of soft coal had been received.

Western Markets Looking Up

A slight improvement in noticeable in the Southwestern market over last week, the operators believing the fall demand actually has started at last. Increased inquiries more than a month ago were thought to presage the opening of the fall market, but there was a setback in the latter part of July and the first half of August, from which the district only now is beginning to recover. Prices hold at recent levels.

The Colorado market continues to drag along, but it is thought that with the heavy movement of crops the railroads will be demanding more coal and a heavy demand for domestic coal is anticipated, as stocks are reported to be low at nearly all points. Colorado mines worked on an average of nineteen hours last week, 50 per cent of the working time lost being due to no market. Prices remain unchanged.

Utah operators have announced a 50c. increase on sizes above 3-in. nut, this size having been reduced 25c. The new schedule will be as follows: Big lump, $4.50; 3-in. lump, $4.25; 3x8-in. lump, $4; 3-in. nut, $3.25. Run of mine, screen slack and straight slack remain at $3.50, $2 and $1.50 respectively. Lump coal is moving best now, but there is a demand for all sizes. The domestic storage business is better than a year ago, due, it is thought, to the rising market more than anything else. Industrial buying is light.

Ohio Trade Gains in Momentum

Business at Cincinnati shows a gain in momentum with some slight advances in the quotations of southeastern Kentucky firms, and from Elkhorn mines in particular. The smokeless market is not enjoying as good a position as the bituminous, the cause seemingly being the fact that the steady run of business through the summer has kept the yards stocked on the domestic and the lake buyers are still chary about rushing in for any more tonnage. River business remains at the same volume as for weeks past. The attempt to work through Kanawha coals has been a bit disheartening to those who reopened on an open-shop basis.

With domestic trade showing slightly more activity, there has been a slight improvement in demand in Columbus. Pocahontas and other smokeless varieties are selling fairly well and there is also a good demand for splints and Kentucky grades. There is little doing in steam coal and the trade is marking time, so to speak. Reserves are still fairly large in some localities and buying is mostly for immediate needs. While there is not nearly as much demurrage coal on the market as formerly, still cheap cargoes can be picked up and bargain hunters are busy. Utilities and railroads are good consumers. Schools are taking in a good tonnage while there is also considerable activity in coal for municipal departments, hospitals and public institutions. Production is showing slight signs of improvement. The lake trade is not as active as formerly owing to the fact that the wants of the upper lake region are close to being filled.

Trade in eastern Ohio seems to be moving along with a casual but slightly increasing steadiness. Inquiries show more life, especially in the retail trade, and this demand is, no doubt, emanating from apartment houses, schools and the domestic consumer. Steam stocks are now a negligible quantity, and steam buyers are taking advantage of every opportunity to purchase small lots at advantageous prices, thereby augmenting whatever small stock they may have and at the same time providing for current requirements.

Coal Moving Better at Pittsburgh

Pittsburgh district coal has been moving a little better of late. Quotations on Pittsburgh steam and gas coals have not been favorably affected by the heavier call for coal. The movement of domestic coal is still in the incipient stage, there being nothing like a regular tonnage. Buying demand for slack has increased noticeably. The additional quantity is furnished by strip mines producing somewhat more and by there being more from deep mines, partly through increased shipments of domestic lump. Pittsburgh steam mine-run continues quotable at $1.75@$2 as the full range of the market, and there has been no distinct change since the decline to this level late in March.

With little or no change in prices, inquiries are becoming

more plentiful in central Pennsylvania, and although to date not much coal is being sold or contracted for, indications point to heavier buying after Sept. 1.

Demand at Buffalo is about as before, but the feeling is somewhat better. Prices are at the bottom and have not changed to any visible extent for quite a long while: $2.25 @$2.50 for Youghiogheny gas lump, $2@$2.25 for Pittsburgh and No. 8 steam lump, $1.75@$2 for all mine run, $1.10@$1.25 for slack.

New England Sees Further Price Drop

In New England pool 1 New River and Pocahontas declined 15c. to $5.25 per gross ton on cars, Boston, brought about entirely by competition, for prices for spot tonnage at the southern loading piers have been slightly firmer. Some business has been done in small lots at $5.40. Consumers' stocks are larger than has been generally believed. In the aggregate quite a fair tonnage has been booked at the low figure, but it is not as large as was anticipated.

The price seems to be sustained at Providence as no really pool 1 mine-run coal is known to be offering under $5.40 on cars, with some business noted at $5.45 within the past few days. And orders are no more plentiful than at Boston.

The situation at the southern loading ports is just a bit firmer. There is little strictly pool 1 mine-run coal offering under $4.10 gross ton, f.o.b. Hampton Roads, now and 5c. and 10c. more is being paid. Some tonnage of pool 1 coal has been shipped to New England in the past fortnight for which the f.o.b. price was under $4, but this is no longer possible. Tonnage appears to remain rather heavy, but there is less slack standing and this injects a firmer tone to prices.

The all-rail situation offers nothing new. Regular consumers of Pennsylvania coal are taking it right along, but there is practically no spot buying. Prices manifest no change from the past week or so.

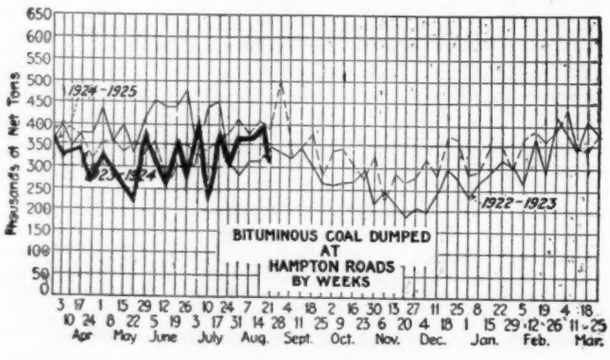
Encouraging Signs in Atlantic Markets

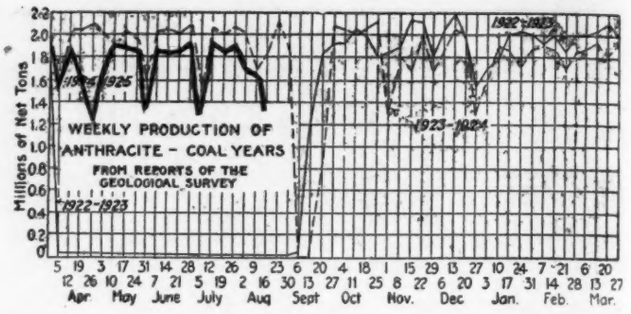
An encouraging sign in the New York situation is the number of inquiries by large consumers. Confidence is slowly increasing and with general business showing signs of greater activity it is expected that actual buying will soon set in. Reserve stocks are slowly fading. Accumulations at tidewater range between 1,100 and 1,500 cars daily, more than sufficient to meet current requirements and in some instances too large to prevent some buyers from picking up bargains when shippers find it necessary to sell coal to avoid demurrage charges.

Buying at Philadelphia is increasing but spotty, the orders being small. Big buyers are still holding off, but expect to be in the market soon, as general business is picking up. Prices remain on about the same level.

Despite the persistent dullness a note of optimism pervades the Baltimore market. Inquiries are not brisk and spot purchasing is at an extremely low ebb, but the trade is encouraged by reports from various industries that conditions are slowly but surely improving. Another lull has come to the export movement, only one ship having cleared during the past week.

Some improvement is being shown at Birmingham, but progress is slow. Orders are somewhat more plentiful for steam fuel in the open market and consumers are taking to contract making in greater numbers. However, there is no great amount of room for optimism as far as actual business booked is concerned, but the undertone is unmistakably healthier and more hopeful and steadily increasing activity is expected from now on. Production for the week of Aug. 9 was 326,000 net tons, showing a fair increase over the previous week, but there has been no improvement in working time at the mines. The iron market is very dull and foundry coke is in a rather quiet position with quotations $5@$5.25 per ton ovens for 72-hour product.





Independents Heavily Booked for Hard Coal

Activity in the New York hard-coal market is largely confined to independent coals, which for the most part are quoted below company schedule. The exception is stove coal, which is quoted by some of the smaller operators at slightly above company schedule, especially when taken straight. Many independents are heavily booked for future delivery and some are refusing quotations for immediate delivery. Stove coal continues to lead in demand, some retail dealers complaining of inability to obtain sufficient to meet the demand. However, most buyers are willing to take a share of their order in either egg or chestnut if assured of the other size. Pea coal moves slowly and operators find it difficult to keep their tonnages moving. There are no favorable signs in the steam-coal situation. Buckwheat No. 1 continues the weakest, while barley appears to be the best seller.

Signs of improvement continue in the Philadelphia anthracite trade, mostly in the retail trade, where the dealers report an increase of small orders. The larger companies still maintain a four-day schedule, but they all hope to make full time during September. Stove coal continues to be the size the dealer wants if he asks for anything at all. Nut and pea are plentiful with all shippers. Steam coals have not improved, although there are faint signs that better movement is likely to be in order soon.

A number of Baltimore anthracite dealers report better ordering. Practically all have liberal stocks on hand and they are delivering as quickly as orders are placed. Coal men are urging consumers to take fuel now, pointing out that prices will undoubtedly advance about 25c. Sept. 1.

Buffalo consumers are buying a little better now. Canadian buyers, however, are far behind their usual outlay.

Not Much Activity in Coke Market

There has been little actual market activity in the past week in the Connellsville coke market, but general conditions show a slight improvement in the outlook. The operators are all firm at $3.25 for furnace coke except for a few that hold out for still more. Foundry coke has been still duller in the past ten days, but the market is unchanged, at $4.00 to $4.50. The *Courier* reports coke production in the Connellsville and Lower Connellsville region in the week ended Aug. 16 at 16,300 tons by the furnace ovens, an increase of 100 tons, and 33,320 tons by the merchant ovens, an increase of 3,200 tons, making a total of 49,620 tons, an increase of 3,300 tons.

Car Loadings, Surplusages and Shortages

	Cars All Cars	Loaded Coal Cars
Week ended Aug. 9, 1924	942,198	149,482
Previous week	945,731	144,865
Week ended Aug. 11, 1923	973,162	177,259

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	Car Shortage
Aug. 7, 1924	296,496	138,325	.....	.....
Previous week	322,530	146,840	.....	.....
Aug. 8, 1923	74,168	6,546	10,149	4,897

Foreign Market And Export News

British Market Subnormal but Steady; Output Hard Hit by Holidays

The Welsh steam coal market continued steadier though holidays have interfered with production and the volume of business is anything but satisfactory. The progress made at the Inter-Allied Conference has encouraged buyers abroad and the pressure for supplies has shown a slight increase. French inquiries are better, Italian business is fair, and South America is taking more coal than during the last two months. Supplies are limited owing to the number of collieries that are closed because of the unremunerative prices, the latest stoppage being the large Cambrian collieries. The better grades of coal are firmer, other sizes are plentiful and cheap. The market position is regarded as increasingly serious.

The Newcastle market remains very quiet except for some improvement in the gas coals section. Many collieries are still closed down, some are on short time, and several are being operated on a day-to-day basis, according to the amount of business received. The Amsterdam gas works has taken 30,000 tons of gas coals, and has placed another order for 30,000 tons in Germany at a lower price. The Lithuanian Rys. have placed an order for 30,000 tons at 28s. 6d. per ton, the class of coal not stated. Northumberland coal hewers will undergo a reduction of 9d. per shift this month on account of the June audit.

The output of the British collieries during the week ended Aug. 9, a cable to *Coal Age* states, was 3,446,000 tons, according to the official reports. This compares with 5,010,000 tons during the week ended Aug. 2. The decline in production was due to the observance of the holiday week.

July exports totaled 5,487,889 tons as compared with 6,767,255 tons a year ago. Exports for the first seven months of 1924 amounted to 36,618,946 tons, which is 10,000,000 tons below the figures for the corresponding period of 1923, or 21 per cent reduction this year. This decline was caused by lower shipments to Germany, the Netherlands, Belgium and France.

Trade Slack at Hampton Roads; Outlook Lacks Promise

The Hampton Roads market shows little or no change from last week, prices remaining almost the same and tonnage dumped continuing in about the same volume. The Norfolk & Western piers dumped 157,000 tons during the week, and indications were that during the coming week the tonnage would pick up.

Shipments to South America continue to be the outstanding movement, cargoes moving out regularly. Returning ship masters assert that Rio de Janeiro is being stocked with American coal.

The three railroads handling coal at the Roads report business slack with prospects of only small increases, if any, in tonnage.

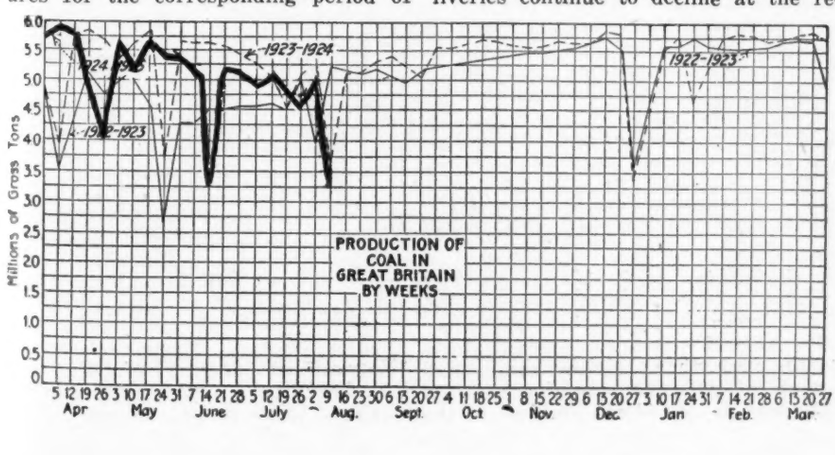
French Domestic Coal Active; Industrial Grades Quiet

Little change is observable in the French coal market, industrial fuel being quiet while house coals are animated and even active; but even in the case of the former stocks are not very important.

Imports from Great Britain are rather weak, buyers holding back owing to the instability of exchange and the prohibitive prices for anthracite grades. Sales of sized coals are few for the present time. Free offers for German coals, outside of indemnity deliveries, are now being made on the Paris market.

The O.R.C.A. was supplied with 39,522 tons Ruhr coke from Aug. 1 to 5, or a daily average of 7,904 tons. Deliveries continue to decline at the request of French industrialists, impelled by financial considerations on one hand, and lack of room to store supplies on the other. No change in price is foreseen for the present.

The M.I.C.U.M. agreement between the German mine owners and the Franco-Belgian Commission in the Ruhr regarding industrial operations and the making of deliveries in kind by the Germans for the reparation account has been extended until Sept. 23.



Export Clearances, Week Ended Aug. 23, 1924

	Tons
FROM HAMPTON ROADS	
For Brazil:	
Br. Str. W. F. Radcliffe for Rio de Janeiro	7,658
Am. Str. Corvus for Rio de Janeiro	6,993
Br. Str. Cornish City for Rio de Janeiro	6,791
Nor. Str. Hermion for Rio de Janeiro	6,688
For Canada:	
Am. Schr. Mary G. Maynard for Hamilton	1,046
Am. Schr. Marguerite M. Wemyss for Hamilton	844
For Newfoundland:	
Dan. Str. Nordhavet for St. Johns	4,964
For Cuba:	
Br. Str. Mabay for Sagua	2,262
Am. Schr. Jennie Flood Kreger for Cienfuegos	2,087
For Italy:	
Ital. Str. Clara for Trieste	2,485
FROM PHILADELPHIA	
For Canada:	
Br. Schr. Avon Queen for St. John	——
FROM BALTIMORE	
For Porto Rico:	
Am. Str. Delisle for San Juan	2,285

Hampton Roads Pier Situation

	Aug. 14	Aug. 21
N. & W. Piers, Lamberts Pt.:		
Cars on hand	1,680	1,051
Tons on hand	103,370	65,827
Tons dumped for week	156,371	157,234
Tonnage waiting	25,000	10,700
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,253	1,797
Tons on hand	94,700	127,000
Tons dumped for week	80,119	53,826
Tonnage waiting	15,880	10,163
C. & O. Piers, Newport News:		
Cars on hand	1,334	1,458
Tons on hand	73,100	79,010
Tons dumped for week	116,696	70,670
Tonnage waiting	5,670	3,285

Pier and Bunker Prices, Gross Tons

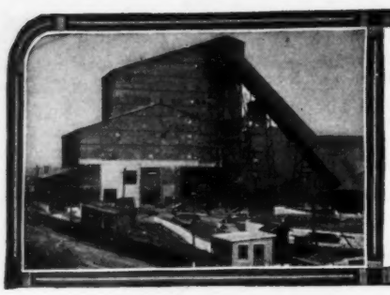
PIERS	Aug. 16	Aug. 23†
Pool 9, New York	$5.25@$5.40	*$4.50@$4.85*
Pool 10, New York	4.25@ 4.50	**4.35@ 4.65**
Pool 11, New York	4.00@ 4.15	**4.00@ 4.35**
Pool 9, Philadelphia	4.70@ 5.00	**4.90@ 5.25**
Pool 10, Philadelphia	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads	4.15	4.10@ 4.20
Pool 2, Hamp. Roads	4.05	4.00@ 4.10
Pools 5-6-7 Hamp. Rds.	4.00	*3.90@ 4.00*
BUNKERS		
Pool 9, New York	5.00@ 5.25	*4.75@ 5.10*
Pool 10, New York	4.70@ 5.00	*4.60@ 4.90*
Pool 11, New York	4.50@ 4.75	*4.25@ 4.60*
Pool 9, Philadelphia	5.00@ 5.30	*4.90@ 5.25*
Pool 10, Philadelphia	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads	4.20	*4.10@ 4.20*
Pool 2, Hamp. Roads	4.10	*4.00@ 4.10*
Pools 5-6-7 Hamp. Rds.	4.00	*3.90@ 4.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

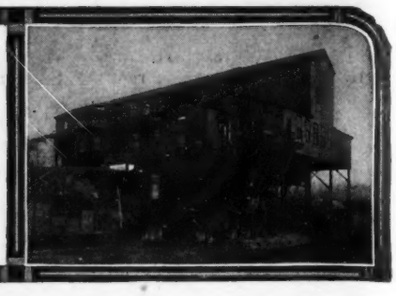
Quotations by Cable to *Coal Age*

Cardiff:	Aug. 16	Aug. 23†
Admiralty, large	28s.@28s.6d.	**29s.**
Steam smalls	17s.	**17s.@17s.6d.**
Newcastle:		
Best steams	22s.@22s.6d.	*20s.9d.@21s.*
Best gas	22s.@22s.6d.	*22s.@22s.6d.*
Best bunkers	20s.6d.	*19s.6d.*

† Advances over previous week shown in **heavy type**, declines in *italics*.



News Items From Field and Trade



ALABAMA

The Sloss-Sheffield Co., of Birmingham, recently placed with the Link-Belt Company, of Chicago, an order for a gondola car dumper. This dumper will be similar to that installed at the Cahokia power station, East St. Louis. The new machine will be required to dump gondola cars of coal of a capacity of 100 tons at the rate of twenty an hour. Only a 19-hp. motor and one man are required for its operation.

According to a statement from John T. Cochrane, president of the Alabama, Tennessee and Northern R.R., with headquarters in Mobile, three surveys recently have been made for a proposed line from Reform, Tuscaloosa County, through Walker County to connect with the St. Louis & San Francisco R.R. at or near Fayette. If this line is built it will afford an outlet to valuable coal fields in Walker County not now served by transportation facilities and will provide a direct short route to the Gulf. It has not been definitely decided that the line will be built or which route it will take if it is constructed.

ALASKA

Wood as fuel is being replaced by coal at a number of Alaskan mining properties in the Fairbanks region as a result of the development of a well equipped mine on the Healy River. The property is operated by the Healy Coal Corporation. The quality of the coal is described as good. The main haulway now has been completed for distance of 1,100 ft. It is timbered, lagged and mudsilled throughout. A new power plant has been installed and electric units to operate the mine on the most economical basis. Sizing equipment also has been installed. This coal also is replacing wood for domestic use in a wide territory along the upper end of the railroad.

COLORADO

Union mine officials, in a letter to the State Industrial Commission, charge the Bell Mining Co., operating in the northern Colorado coal fields, with making an unauthorized cut in wages. The union officials assert that the company, without authority, reduced wages from $8 to $7 a day. The management of the company verbally denied the charges, maintaining that the cut was made in accordance with an agreement made with the Mine Workers when the company took over the properties, May 1. Under terms of the agreement, the management says, it was agreed to pay the same scale in effect at the Eureka mine, another company working. This scale provided for $7 a day.

ILLINOIS

Frank F. Tirre has been appointed general manager of the Mulberry Hill mine of the St. Clair Coal & Mining Co., at Freeburg, and also in charge of sales, with headquarters in the Fullerton Bldg., St. Louis.

In these times of despondency in the coal trade it is unusual in Illinois to learn that coal leases are being taken up, for which reason much surprise has been occasioned by the activities of agents purporting to represent the Crawford Coal Co., of Chicago, who have been leasing acreage in eastern Williamson County, along the Illinois Central R.R.'s Edgewood cutoff.

Railroad building in the Franklin County coal field would seem to indicate an early pick up in the coal industry. The Illinois Central is planning a switch from a point between Benton and Logan to mines Nos. 1 and 2 of the Chicago, Wilmington & Franklin Coal Co., also tapping mine No. 18 of the Industrial Coal Co. at West Frankfort. The Missouri Pacific R.R. will build from half way between Buckner and Benton to mines Nos. 1 and 2. Trains at these mines will be made up as the coal is loaded and a "Joint-road" locomotive will deliver the "trains" to each of the four trunk coal carriers, the Illinois Central, the Missouri Pacific, the Burlington and the C. & E. I.

Richard J. O'Halloran, a coal miner, of Spring Valley, has announced his candidacy for president of the State Labor Federation. "The interests of labor require the entire time of its leaders," says O'Halloran. "In the present campaign John Walker, president of the state Labor Federation, and his group of co-workers devote about 80 per cent of their time working in behalf of Governor Small's re-election. And while the officialdom of the state labor federation is working for Small the interests of 40,000 unemployed coal miners in the state are neglected. Most of these miners don't know where the next meal is coming from." According to O'Halloran he has been promised the support of the state miners and a number of large Chicago unions. The nominations will be held this month and the election in December.

The Lovington Coal Co., successor to the Lovington Coal Mining Co., was organized at a meeting held at Lovington, Aug. 12. The new company starts with more than half of the capital stock of $100,000 subscribed for on the first day. Old stockholders of the company which went into bankruptcy, to the number of probably 125, attended the meeting and were given the first chance to subscribe for stock in the new company. At the receivers sale, the old company was sold to George Spitler, acting for a group of the stockholders, for $5,000, recognized as a nominal price for the property, which represented an investment of a half million dollars and which had paid dividends during the life of the company to the total amount of $300,000. Directors of the new company were elected as follows: J. A. Vent, Hammond; E. L. Beall, Decatur; R. E. Bowers, Lovington; Daniel Hall, Dement; John Benson, Decatur; George Spitler, Mt. Zion; D. W. Beggs, Decatur. A meeting for the election of officers and for general organization will be held soon.

INDIANA

The Triangle Coal & Coke Co., Auburn, has reduced its capital from $25,000 to $10,000.

Work in the new Deep Vein coal mine, three miles south of Princeton, was resumed recently after it had been shut down for several months for the installation of new equipment. The present force consists of fifty men, but this will be increased as soon as rooms are opened up on the two main entries. The mine is electrically equipped. It is situated on the Chicago & Eastern Illinois R.R. E. J. Smith, of Terre Haute, is president of the company.

Improving conditions in the Indiana coal fields are reflected in the resumption of operations by the McClelland Coal Co., at its mine south of Terre Haute after several months' idleness. Two hundred men have returned to work and within a short time from 50 to 100 more men will be placed at work there. Several of the larger mines in the Terre Haute-Clinton field and in the field south of Terre Haute have resumed operations in the last few weeks, sending many miners, who had been idle for several weeks, back to their work.

Governor Branch has named twenty-one delegates to represent Indiana at the American Mining Congress to be held in Salt Lake City, Utah, Sept. 29, to Oct. 4. The list of delegates is as follows: William Johnson, Vincennes; Harvey Conrad, Bicknell; James Moore, Evansville; Harry Sherburn, Terre Haute; Clem Richards, Terre Haute; Frank A. Kattman, Terre Haute; Richard Thomas, Universal; Norman McClevey, Petersburg; John A. Templeton, Terre Haute; Homer Talley, Terre Haute; Duncan McDill,

Clinton; Ed Shirkie, Terre Haute; W. G. Spears, Terre Haute; George T. Gillson, Universal; John Sieffert, Terre Haute; L. M. VanArsdale, Sullivan; T. I. Roberts, Terre Haute; John Ellison, Winslow; John Oglivie, Bicknell; W. E. Cox, Francisco and H. P. Dyer.

IOWA

Increased consumption of fuel mined in Iowa to the exclusion of foreign mined coal was urged at a meeting of miners and union officials at Des Moines Aug. 11. Lawrence Love, representing the mine operators, and John P. White, former international president of the mine workers, urged an active campaign to convince householders of the state that it is to their interest to burn Iowa coal. George Baker, head of the farmers' union, pledged the help of the farmers of the state to the movement of the miners. Joe Morris, president of district No. 13, United Mines Workers, and John Gay, secretary of the district, declared the officers and district board would co-operate with the local miners.

KANSAS

A. C. Ellsworth, who as a member of the Ellsworth-Klaner Coal Co. thirteen years ago pioneered steam-shovel coal mining in the Pittsburg field and more recently has been directing the affairs of the Ellsworth Coal Co., has sold his Pittsburg residence and announced that he will dispose of his coal interests. Mr. Ellsworth will move to Chicago, where he has real estate and other property interests. The Ellsworth company has two large steam-shovel mines near Minden, Mo., in operation and recently acquired a tract of coal land near Bronaugh, Mo.

W. C. Ernhart, superintendent of the Central Coal & Coke Co. mines in the Pittsburg field, resigned, effective Aug. 15, to take a position with an Indiana coal company. He is succeeded by Roscoe H. Reid, who had been assistant superintendent. Mr. Reid entered the employ of the Central twenty-two years ago as a clerk. The Central operates four large shaft mines and a shovel mine in the Pittsburg field and has a large unworked acreage. It has recently acquired large tracks in Craig County, Oklahoma, adjoining the Kansas border, and will soon develop it. The office of assistant superintendent will be abolished with the promotion of Mr. Reid to the superintendency.

KENTUCKY

Abner Lunsford, who has charge of the Henry Ford mining interests in West Virginia and Kentucky, when in Cincinnati recently, said that he was so well satisfied with the movement to the Ford coal roads, boats and upper lakes docks that he had given orders to run the Pond Creek Coal Co.'s properties on full time.

The Gatliff Coal Co., of Williamsburg, has increased its capital stock from $75,000 to $375,000.

Fire starting in the boiler room of the Norton Coal Mining Co., at Empire, Ky., in Christian County, on Saturday night, Aug. 16, destroyed tipple, boiler room, a loaded gondola, and put the mine out of operation.

J. W. Ailstock has resigned as assistant superintendent of the Youngstown Sheet & Tube Co.'s Rum Creek No. 5 mine, at Dehue, Logan County, W. Va., and is now mine superintendent of the Weeksbury mines of the Elkhorn Piney Coal Mining Co.

Five men were reported to have been killed in the mines of the United States Coal & Coke Co., near Harlan, Ky., on Aug. 18. Three men were crushed to death in a slate fall, a fourth later from injuries received in the fall, while a fifth man was electrocuted in another company mine.

The rapid development of strip mining in Kentucky is shown at Centertown, Ky., where the Morrison Coal Co. is reported to be loading around 600 cars a month, and the Kershaw Mining Co., around 1,000 cars a month. The Dawson Daylight Coal Co., near Dawson, the newest and largest strip operation, has had its first cars set in and has just completed its shovel and equipment, and was reported to be starting operations this week. This mine is on the new Central City-Dawson Springs extension of the Illinois Central R.R., which will be in full operation for its entire length in October.

An order has been issued by Judge A. M. J. Cochran of the U. S. Court of the eastern district of Kentucky for the sale of three mining properties of the Jewett, Bigelow & Brooks group in southeastern Kentucky. As soon as the legal requirements can be met receivers E. L. Douglas and Harry Ritchey have been ordered to sell the properties of the Hazard Jellico Coal Co., the Black Joe Coal Co. and the First Creek Coal Co. All of these are in the Hazard district. The receivers have been handling the properties for about three months.

Tax assessments of five coal companies in Pike County and one in Hopkins County were certified to W. H. Shanks, Auditor of Public Accounts, and to the County Courts by the State Tax Commission. All make considerable raises, Commissioner Wells said. The assessments in Pike County: Edgewater Coal Co., $577,592; Big Sandy Co., $1,225,010; Consolidated Coal Co., $1,028,167; Colony Coal & Coke Co., $393,610; Fordston Coal Co., $2,975,028. The St. Bernard Mining Co., Hopkins County property was valued at $2,393,497.

MINNESOTA

Bids were opened last week by the City and County Board of Control in St. Paul for furnishing coal for the county poor farm and for the Ancker city hospital. The low bid for the hospital for 2-in. Indiana screenings was that of the North Western Fuel Co., St. Paul, at $5.15 delivered, while the C. Reiss Coal Co. was low for Hocking screenings at $5.60. For the county home, the M. A. Hanna Coal Co. was low for 2-in. Indiana screenings at $4.60 and the Northwestern Fuel Co. for Hocking screenings at $5.15.

MISSOURI

The miners' union and coal operators of the Fulton district have reached an agreement on prices for the next fiscal year, the miners setting a price of 8c. a bushel for mine run and 9c. a bushel for screened coal. Contracts on this basis are being signed.

NEW YORK

Sealed proposals will be opened by the Superintendent of Lighthouses, Staten Island, N. Y., 2 p.m., Sept. 2, 1924, for approximately 1,800 tons of bituminous coal in quantities as required during October, November, and December, delivered and trimmed into vessel's bunkers under contractor's coal chute, New York Harbor. Information upon application.

Courtesy U. S. Distributing Corp.

Seams of Mammoth Thickness Are Found in Wyoming

This scene is in No. 45 mine of the Sheridan-Wyoming Coal Co., at Monarch, Wyo. The height of the topping is almost as great as the depth of the car from upper edge to car bottom.

Coal dealers docking their barges at the municipal docks in the City of New York will have to pay an increase of about 1c. per ton if the new wharfage rates proposed by Dock Commissioner Michael Cosgrove become effective. The proposed rates show practically a uniform increase of 100 per cent above the existing schedule and, according to Commissioner Cosgrove, will be the first general revision since 1870. The new rates propose a charge of 1c. a running foot with a minimum charge of $1 for boats transporting coal docking at bulkheads or unshedded piers. For boats docking at shedded piers the charge will be 2c. a running foot, with a minimum charge of $2.

OHIO

The receivers of the Maynard Coal Co., Columbus, have appointed A. L. Allais, of Chicago, manager of their eastern Kentucky properties in the Hazard field. Two of the mines use Lennut, as their shipping point, the third, Heiner. Mr. Allais has been authorized by the receivers to make all repairs necessary for the immediate opening of the three operations and it is expected that within the course of the next week or so the mines will be running again. Mr. Allais is president of the Columbus Mining Co., with headquarters in the McCormick Building, Chicago, operating four mines adjacent to the Maynard properties in the Hazard field. The Columbus Mining Co., will market the output of the Maynard properties.

OKLAHOMA

The strip pit of the Pine Mountain mine at Heavener is installing machinery costing $250,000. A steam shovel equipped with electric lights, so that it may be worked night and day, is a feature. A specially constructed shovel for loading coal also is to be installed. A rotary dump and cars of 5 cu.yd. capacity have been purchased. The tipple will be equipped with a scraper line conveyor which takes the coal from the rotary dump hopper to the shaking screens, where the different sizes will be separated, and then to the 40-ft. loading booms and dumped in freight cars. An 18-ton dinky engine will furnish power.

PENNSYLVANIA

Pennsylvania State College will start in the autumn a new optional course for students desiring special training in coal-mine engineering.

The two big mines of the Mather Coal Co., at Mather, Greene County, which had been closed for six months, resumed two weeks ago with the expectation of producing about 9,000 tons daily by the end of the week.

The Scotch Valley mines, near Mt. Grove, between Berwick and Bloomsburg, will soon resume operations and 200 men who have been out of work since last December will be put on their old jobs. Work on the new $100,000 breaker to replace the one burned during the strike last December is being rushed and it is expected that the plant will be ready for the preparation of coal early in November. The new breaker will have a capacity between 600 and 800 tons of coal a day.

The Buckeye Coal Co. has resumed 75 per cent activity at its mine at Nemacolin, ten miles east of Waynesburg, Greene County. Its first day's production was 2,500 tons, but it expects to have full production of 5,000 tons daily by Sept. 1, with the completion of a skip shaft. The mine had been closed since June 4.

Many workers who left the anthracite fields during the suspension of 1923 and located in New England cities and towns are returning because of industrial conditions, employment agents report. There has been some retrenchment in the hard-coal collieries, but it is predicted they will be operated on full time soon. Some of the small mines have been closed or workers have been laid off on account of a drop in demand for the steam sizes of fuel.

The British Government has shipped to Pittsburgh half a ton of its permitted explosives, which will be tested by the Bureau of Mines.

Maderia, Hill & Co., of Philadelphia, owners of several large anthracite-producing mines, have purchased the Buck Ridge Colliery near Shamokin. The mine has been shut down since last December, when the Buck Ridge Coal Co., which formerly operated the mine, was forced to ask for a receivership. The new owners have issued orders for a resumption of work. The colliery, during normal operation, gives employment to 400 men.

M. R. Campbell and W. T. Thom, of the Geological Survey, have been doing geological work in the Lykens Valley region of the anthracite field.

UTAH

The Oregon Short Line Ry., which maintains large offices in Salt Lake City, will construct a line to the Brown Bear coal mine in Teton County, Idaho.

Two noteworthy tipples are now under construction in the Utah coal fields, each of which represents an investment of more than $200,000. The United States Fuel Co. is erecting a five-tracker at Hiawatha which should go into service this autumn and the Spring Canyon Coal Co. is about to erect one at its Storrs mine. Both tipples, especially that at Storrs, will be equipped to supply the latest refinements of coal preparation.

WEST VIRGINIA

Fire of unknown origin on Aug. 12 caused "several thousand dollars" damage in the Putney mine of the Campbells Creek Coal Co., Putney, according to M. V. Rensford, general manager.

The Super Fuel Co. is being formed by O. Proelss and others at Moundsville, W. Va., with a capital stock of $100,000, about $40,000 of which has been subscribed by the officers of the Franklin Coal Co., of West Virginia. The contract for the erection of a plant at which the sulphur will be separated from the fuel part of coal has been awarded to the Pittsburgh Super Fuel Co. and the new plant is to be ready for operation some time in December. The plant will employ about 200 men. O. Proelss will have charge of the new plant.

With a view to building three miles of railroad from Henlawson to the mines of the Merrill Coal Mines, Inc., in Logan County, the Little Creek Railroad Co. has been organized with a capital stock of $400,000. Active in organizing this company were C. V. Jones, F. M. Livezey, S. S. McNeer, J. F. Eaton and M. L. Burnett, all of Huntington.

WYOMING

A. J. Collier has mapped the Buffalo anticline in Sweetwater County for the U. S. Geological Survey.

P. J. Quealy, head of the Kemmerer Coal Co., of Kemmerer, was originally slated to be one of the committee which formally notified John W. Davis of Clarksburg, W. Va., of Mr. Davis' nomination by the Democratic party for the Presidency of the United States. Mr. Quealy was slightly indisposed, however, and did not go East.

CANADA

J. F. Soward, of the John Soward Coal Co., of Kingston, Ont., has returned from Scotland, where he purchased a new steamer for the lake coal trade. The boat, which was built in Glasgow, has arrived at her dock in Kingston.

James Smith, of Edmonton, has been appointed by James Murdock, Federal Minister of Labor, chairman of the board of conciliation to investigate the dispute between the operators and men in the Edmonton coal field. R. J. Drinnan will represent the operators and P. J. Rowe the employees.

New Companies

The Mender-Patton Coal Co., Nelsonville, Ohio, has been incorporated, with a capital of $10,000, by William Patton and E. D. Mender.

The Martins Ferry Coal Co., Martins Ferry, Ohio, has been incorporated by J. D. Hall and Lenora Boyers. The company has a capital of $10,000.

Articles of incorporation for the **Medicine Lake Coal & Clay Co.**, in Sheridan County, Montana, have been filed with County Clerk and Recorder Verne Johnson. The location is section 16, township 32 north, range 55 east. Headquarters will be in the town of Medicine Lake. Capital stock is listed at $100,000, the three directors being R. P. Jones, of Medicine Lake, T. H. Class and John O'Boyle, of Billings.

The Cornelius Coal & Mining Co., Vincennes, Ind., has been incorporated with a capital of $25,000. The directors are: James H. Cornelius, Homer L. Oliphant and A. J. Marks.

The Kentucky Coal Distributing Corporation, Evarts, Ky., capital $10,000, has been chartered by W. B. Smith, O. H. Wood and W. C. Turner.

The Barnett Fuel Co. has been incorporated in Kansas City, Mo., with a capital stock of $25,000, by Max Barnett, David R. Derge and Alton Gumbiner, and has opened headquarters in the Gloyd building.

The Cass Coal Co. has been incorporated at Cass, Ind., for the purpose of prospecting for coal and clays. The incorporators are: Charles Arthur, Charles Scammehorn, Earl Cox, Jesse Daniels and William Thompson.

Traffic News

Recommends Revised Rates from Colorado and New Mexico

The Colorado & New Mexico Coal Operators' Association was upheld by Examiner Koebel, of the Interstate Commerce Commission, Aug. 18, in its contention that the rate structure on coal, including anthracite, bituminous and lignite, was unreasonable and prejudicial and preferential to competing coal-producing districts of other states. The complainants operate coal mines in Colorado and northern New Mexico and sought a revision of rates on coal in carloads to Missouri River points and destinations in western South Dakota, Nebraska and Kansas.

Examiner Koebel recommended a revision of the present rate structure to the commission.

Rate Boost by C. & O. Suspended

Proposals of the Chesapeake & Ohio Ry. to increase the westbound rates and reduce the eastbound rates on bituminous coal, carloads, moving between stations in West Virginia, north of Belva, were ordered suspended by the Interstate Commerce Commission Aug. 22. Pending an investigation by the commission the carrier's proposals have been suspended from Aug. 25 until Dec. 23 next.

Recent Patents

Apparatus for Washing Coal; 1,477,955. René A. Henry, Liege, Belgium. Dec. 18, 1923. Filed Dec. 31, 1919; serial No. 348,672.

Coal Cutting and Loading Machine; 1,478,280. Francis K. Holmsted, Charleston, W. Va. Dec. 18, 1923. Filed Jan. 3, 1920; serial No. 349,210.

Coal Cutting and Loading Machine; 1,478,281. Francis K. Holmsted, Charleston, W. Va. Dec. 18, 1923. Filed Oct. 3, 1922; serial No. 592,057.

Miner's Kit; 1,478,296. W. K. Peters and Alex Foster, Freeman, W. Va. Dec. 18, 1923. Filed Feb. 2, 1922; serial No. 533,534.

Mine-Air Stop; 1,478,303. Stephen H. Snyder, West Pittston, Pa. Dec. 18, 1923. Filed April 5, 1922; serial No. 549,947.

Mine-Door Operating Mechanism; 1,478,970. Hugh G. Liggett, Roy Peterson and Sherman W. Liggett, Salineville, Ohio. Dec. 25, 1923. Filed May 27, 1922; serial No. 546,022.

Coal-Loading Machine. Mike Persech, Walsen, Colo.; 1,481,737. Jan. 22, 1924. Filed April 6, 1922; Serial No. 550,047.

Aerial Tramway System. Edward H. Sackett, Arvada, Colo.; 1,481,746. Jan. 22, 1924. Filed June 26, 1922; serial No. 570,921.

Mining System and Apparatus. Edmund C. Morgan, New York, N. Y., Olive E. Morgan, executrix of Edmund C. Morgan, deceased; 1,481,875. Jan. 29, 1924. Filed Dec. 23, 1919; serial No. 346,902.

Tool for Handling Blasting Caps. Elmer Dial, Mill Run, Pa.; 1,482,184. Jan. 29, 1924. Filed May 25, 1923; serial No. 641,363.

Automatic Mine Pump. Chester Lewis, Hazard, Ky.; 1,482,238. Jan. 29, 1924. Filed Dec. 30, 1922; serial No. 609,974.

Rabble for Low-Temperature Coal Distillation Purposes. Edward Barrs, London, England; 1,482,342. Jan. 29, 1924. Filed Dec. 19, 1921; series No. 598,561.

Tie for Mine Tracks. Edward A. Booher, West Austintown, Ohio; 1,479,531. Jan. 1, 1924. Filed July 28, 1923; serial No. 654,390.

Jig-Pan Supporting and Vibrating Means. George W. Wilmot, Hazleton, Pa., assignor to Wilmot Engineering Co., Hazleton, Pa.; 1,479,573. Jan. 1, 1924. Filed Nov. 10, 1921; serial No. 514,164.

Lamp Holder for Miners' Caps; 1,485,842. James J. Fisher, Austen, West Va. March 4, 1924. Filed Aug. 23, 1922; serial No. 583,809.

Rotary-Dump Feeder Mechanism; 1,486,104. James A. Nolan, Bowerston, Ohio. March 4, 1924. Filed Aug. 7, 1922; serial No. 580,260.

Obituary

"Dutch" Bowling, superintendent of the Cardiff Pocahontas Coal Co., of Lexington Ky., was killed near Bluefield, W. Va., on Aug. 13, when his auto was sideswiped by another machine, causing Bowling's machine to plunge over an embankment into Tug River, death being instantaneous.

Edwin Thomas, identified for years with the iron and coal industries in the Lehigh Valley, Pennsylvania, died Aug. 17, at his home in Catasauqua, Pa. He was president of the Pioneer Mining & Manufacturing Co., of Birmingham, Ala., before that concern was taken over by the Republic Iron & Steel Co. Mr. Thomas was 70 years old.

Charles Oliver, 68 years old, of Paonia, Col., a retired mine operator, died in Pueblo, Col., recently. He was a pioneer resident of Colorado, having gone to that state in 1879. He leaves his widow, Mrs. Mary Oliver, of Paonia; a brother, Alexander Oliver, of Alamosa, Col.; a son, Curtis L. Oliver, and two daughters, Mrs. C. D. Hailey, and Mrs. E. T. Morgan of Maywood, Ill.

Dover Williams, 50 years of age, brother of John W. Williams, well known Knoxville (Tenn.) operator, and himself active in the Harlan (Ky.) fields for a number of years, died at Fountain City, Tenn., Aug. 15. He was an assistant to K. U. Meguire in Harlan County for some years as superintendent of the Lick Branch Coal Co., lessee of the Harlan Coal Mining Co., of which K. U. Meguire was president. For years he was active at Harlan and Coxton. More recently he had been in charge of mining operations at Summitt, Ky., for a rock asphalt company. A widow, son and two daughters survive.

William D. Walbridge, coal operator and authority on bituminous coal mining, died Aug. 8, funeral services being held Aug. 10, at his home in Shrewsbury, N. J. Mr. Walbridge was president of the Pulaski Anthracite Coal Co. and the Delparin Anthracite Briquet Co., having retired from the presidency of the American, Kentucky Block and other coal companies. He was born at Toledo, Ohio, in 1856, a son of the Rev. Henry B. and Helen Chase Walbridge, his mother being a sister of the late Chief Justice Salmon P. Chase. His wife, formerly Mary Southwick, of Albany, and a daughter, survive.

Coming Meetings

New York State Coal Merchants Association, Inc., 14th annual convention, Sept. 4-6. Stamford-in-the-Catskills, N. Y.; headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

American Chemical Society. Fall convention Sept. 8-11, 1924, at Ithaca, N. Y. Secretary Gas and Fuel Section, O. O. Malleis, the Koppers Co., Pittsburgh, Pa.

Oklahoma Coal Operators' Association. Annual meeting Sept. 11, 1924, McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Association of Iron and Steel Electrical Engineers. Annual meeting and exposition at Duquesne Garden, Pittsburgh, Pa., Sept. 15-20. Secretary, John F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

National Safety Council. Thirteenth annual safety congress Sept. 29 to Oct. 3, Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

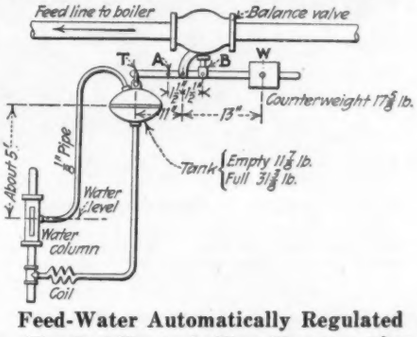
American Institute of Mining and Metallurgical Engineers. Fall meeting, Birmingam, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

American Institute of Electrical Engineers. Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Device Keeps Boiler Water At Fixed Level

To keep water in a boiler at any given level the Cooperative Utilities Co., 1014-15 Harrison Building, Philadelphia, Pa., has provided a feed-water regulator, both simple and practical. When the water rises in the water column to the level of a small pipe, steam ceases to flow through the pipe to a small tank, which weighs empty about 12 lb. and full of water about 32 lb. When the stream is thus shut off,



Feed-Water Automatically Regulated

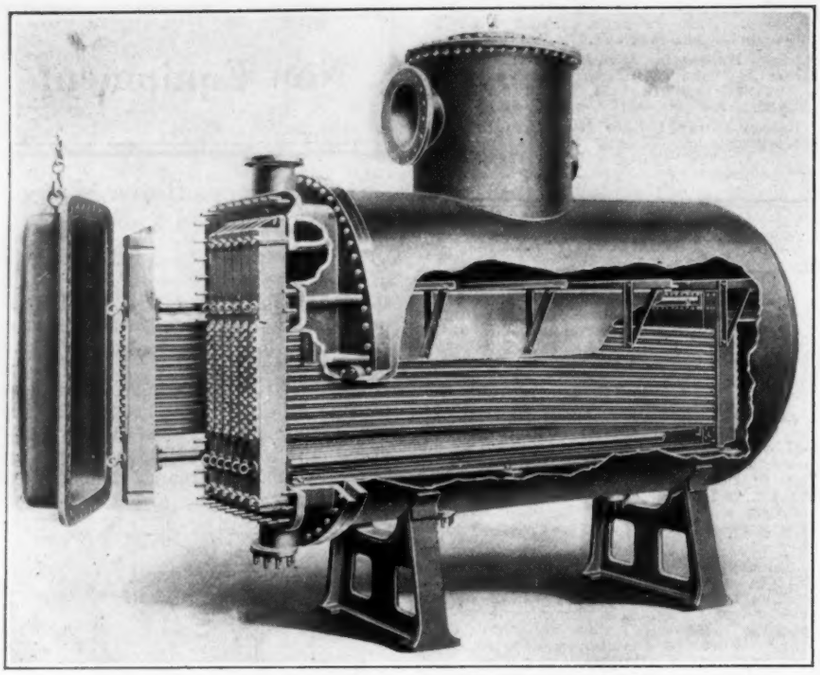
The float-like tank fills with water when the water is high and so falls pushing up a value on the other end of a lever. This shuts off feed.

that which is already in the tank and pipe condenses and the water is forced from the column up the pipe and into the tank. The tank is suspended from a lever *TW* at *T*, a counterweight being hung at *W* and the fulcrum being at *A*. When, owing to the increased weight of the tank, it descends lifting the counterweight, it raises the stem *B* of the balanced valve in the feed line and thus shuts off the flow of water to the boiler. As soon as the water in the boiler drops, the water flows out of the small tank, steam taking its place. The tank is thus made light and the counterweight accordingly falls pulling down the stem of the balanced valve and thus restarting the flow of water to the boiler. Thus the water is kept at a constant level.

Frees Boiler from Scale And Keeps Itself Clean

Pure distilled makeup water enables boilers to be run without scaling, makes boilers efficient in operation and enables them to be run without being blown off or shut down for repairs. Equipment known as the G. R. Bentube Evaporator has been placed on the market by the Griscom-Russell Co., 90 West St., N. Y. It has self-scaling heating tubes widely spaced which carry steam through the evaporator and vaporize the raw water in the shell. These tubes being bent distort with temperature changes and effectively crack off accumulated scale.

The tubes being fully submerged give the heating surface maximum efficiency, prevent superheated vapor, the baking



Bentube Evaporator for Makeup Water

When water is used again and again, efforts spent in keeping the little water clean that the boiler requires to replenish its losses, result in great boiler efficiency. The bent tubes in this evaporator buckle when heated, break off the scale and keep clean and pervious to the heat of the steam passing through the tubes.

of scale on the tubes and the formation of corrosive gases. Ample room is provided for the removal of accumulated scale at the bottom of the shell. The heating surface is sloped for the free drainage of condensed steam. The tube bundle consists of a series of independent vertical sections, each easily removable for inspection. The shell and vapor dome are of welded steel plate.

Unusually Small and Light Watt-Hour Meter

A new service type of direct-current watthour meter has been placed on the market by the General Electric Co. This meter is much smaller and lighter in weight than the present type. In addition to its reduced size and weight, other outstanding features are a thin cast alloy back or base; bottom connections with separate terminal compartment and removable treminals, and the same damping magnets and register as used on standard service type alternating-current meters, together with armature and shunt field coil similar to those used in a previous type.

Small Direct Current Meter

Primer for Steel Surfaces

A new paint known as Dixon's Red Lead-Graphite Primer recently has been placed on the market by the Joseph Dixon Crucible Co., of Jersey City, N. J. For over a year this product has been under test by practical painters and has been found to meet the most rigid requirements.

Flake silica-graphite, red lead and a high-grade oxide of iron make up the pigment of this paint. The vehicle is boiled linseed oil. This primer will thus dry under normal conditions in about 22 hr.

It has been the design in making this paint to combine the desirable qualities of red lead with the water-repellant characteristics of silica-graphite. In application both the drag on the painter's arm and the wear on the brush are less than where straight red lead is used. Furthermore, this product will not chip or scale off, has greater covering power than red lead and is appreciably cheaper. It thus meets the needs of those who desire to use a red-lead paint as a primer.

Permissible Locomotive Has Approval of Bureau

The Bureau of Mines, has approved as permissible for use in gaseous mines a storage-battery gathering locomotive built by the Mancha Storage Battery Locomotive Co., St. Louis.

The locomotive has single-end control and has a single motor with worm drive for each axle. Its weight complete is from 7 to 8 tons. The same type of headlight, headlight switch and headlight fuse compartments are used on both locomotives. The motor on these locomotives was made somewhat larger than formerly was used for the same weight, and the capacity of the resistance has been considerably increased. The new controller is more readily accessible than the one on the first locomotive built by this company and approved by the Bureau. The casings of the main three-way fuses have an insulating liner with greater clearances inside. The ampere-hour meter is housed in an explosion-proof casing and is insulated from the casing.

Approved Battery Locomotive

The motor, controller, resistance, main fuse box, headlight, headlight switch and headlight fuse box and ampere-hour meter housing were judged to conform to the requirements established for testing storage-battery locomotives for use in gaseous mines.

Housing Takes the Thrust In Either Direction

A double-thrust worm box has just been placed on the market by the W. A. Jones Foundry & Machine Co., of Chicago. It provides an accurate and rigid support for the worm shaft and holds a liberal supply of oil in which the worm operates. Finished thrust washers are provided at both ends of the worm. They consist of two steel and one hard fiber washer placed in the center. The bearings are babbitted and faced on the ends. These boxes are now made in standard sizes to suit the standard-cut steel worms made by this company. These boxes are recommended for use with open worm-gear drives when something less expensive is demanded.

Semi-Closed Worm Box

These units are constructed so as to take any of the standard size worms made by this company.